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ABSTRACT

The first paper in this volume "Self-Study in American Colleges and Universities - A Review," discusses the concept of institutional research and briefly explores the history of institutional research in American higher education. The other papers deal with institutional research and self-studies as functions of different departments and offices of Pennsylvania State University, including the Office of the Vice-President for Planning, the Controller's Office, Personnel Services and Employee Relations, the Department of Management and Engineering, the Office of the Vice President for Academic Affairs in Institutional Research, the Department of Planning Studies in Continuing Education, the Office of Student Affairs, and the Center for the Study of Higher Education. The last paper presents a summary and overview of institutional self-study at Pennsylvania State University. (AF)

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# Institutional Self-study at The Pennsylvania State University

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University Park, Pennsylvania 16801

December 1970

*CENTER FOR THE STUDY OF HIGHER EDUCATION*

*THE PENNSYLVANIA STATE UNIVERSITY*

*The Center for the Study of Higher Education was established in January 1969 to study higher education as an area of scholarly inquiry and research. Its studies are designed not only to be relevant to the university and the Commonwealth of Pennsylvania, but also to colleges and universities throughout the nation. The immediate focus of the center's research falls into three broad areas--governance, graduate and professional education, and human service occupation programs in two-year colleges.*

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# PREFACE

The purpose of this volume is to provide a descriptive overview of institutional research conducted at The Pennsylvania State University. Penn State is a Land Grant university, with a system of 19 Commonwealth campuses that spread its undergraduate instruction function throughout the state. These campuses are primarily concerned with freshman- and sophomore-level instruction. The primary graduate center and largest undergraduate instructional unit is the main campus at University Park, Pennsylvania. It is here that most of the university offices are located and much of the institutional research conducted. As a result, this overview is concerned only with institutional research performed at the University Park campus.

When the Center for the Study of Higher Education was formed in the spring of 1969, it was envisioned in part as an appropriate agency to conduct institutional research. Subsequent investigation revealed that a considerable amount of institutional research of a self-study nature was already being conducted on a decentralized basis, and it was decided that the most appropriate

contribution the center could make at this time would be to provide a general description of the offices conducting the studies and the kinds of projects they have conducted, are conducting, or plan to carry out.

It is not assumed that the description and summaries that are included in this volume represent an exhaustive examination of either the sources or a cataloging of institutional studies at Penn State. The papers that follow were solicited from most of the vice-presidential offices. In all cases, responsibility for preparation of the papers was given to individuals who have some direct involvement in studies conducted by these offices. The intent is to provide a representative selection of the kinds of studies conducted and of the offices that conduct studies on institutional problems at Penn State.

The first paper in this volume provides a broad interpretive frame of reference, while offering a brief discussion of the definition and history of institutional self-study in American higher education. Among the selections relating directly to the studies at Penn State, several broad groupings can be seen, although the sections are not physically divided in this manner.

Activities concerned with the efficiency of university operations, particularly those concerned with business and finance are discussed by the offices of the controller, and the vice-presidents for business, finance and planning. These groups have pointedly been under the increasing pressures for accountability and justification faced by most higher education activities in their relations with government and society.

Another broad group conducts institutional research to support the university's academic activities. Both the Office of the Vice-President for Academic Affairs and the division of Continuing Education are concerned with problems of instructional effectiveness and relevance. They spend much of their efforts on problems of basic importance and national significance, that are

also simultaneously of particular institutional relevance The Planning Studies Department in the division of Continuing Education represents a unique effort on the part of a university to identify areas in which innovative service-oriented programs can enhance the overall contribution of the institution to the population it serves.

Student Affairs Research and the Center for the Study of Higher Education are two areas that focus on problems basic to all higher education. While providing the information for the research needs of the Office of the Vice-President for Student Affairs, Student Affairs Research simultaneously conducts long-range study of the impact of the college experience on students. The Center for the Study of Higher Education assists in the conduct of institutional self-studies, while supporting research on the governance of higher education and other areas that are national in scope.

Each of the papers has been written in response to several general questions with the writers free to interpret the questions in terms of the efforts of their particular offices or departments. Essentially, the papers all offer brief descriptions of an office or department, a statement about the needs for organized self-study as seen from those particular reference points within the university, and some examples of specific studies conducted.

A concluding paper has been prepared by the editors. It attempts to place what has been found in the way of institutional research at Penn State in the context of problems of governance in higher education.

The intent is to provide the reader with an understanding of the scope of institutional research efforts at Penn State. Although the university has no central organizational provision for this kind of study, one can readily see that significant efforts are being made toward an empirically based self-understanding.

# ACKNOWLEDGEMENTS

The editors wish to express their appreciation for the efforts of each of the contributors. All took time from busy schedules to write the papers that appear here and to confer with the editors. Without exception, they bore the intrusions upon their time with equanimity and have provided us with the most generous cooperation. We also want to thank Sharon M. Friedman for her patience in supervising preparation of the final manuscript.

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# SELF-STUDY IN AMERICAN COLLEGES AND UNIVERSITIES-- A REVIEW

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SUMMARY

This paper discusses the concept of institutional research and briefly explores the history of institutional research in American higher education. The concept has been loosely defined as whatever an institution does using a variety of methods to know its inputs, its operations, and its outputs. It appears accepted that institutional research has become an important aspect of higher education only within the last 10 years, although its history can be traced back for at least several decades. Commonly, institutional researchers claim to be frustrated by the lag in assimulation of their findings into practices of colleges and universities. It is suggested that the importance of conducting institutional research may be assessed in the light of rising pressures faced by colleges and universities for stricter public accountability.

# SELF-STUDY IN AMERICAN COLLEGES AND UNIVERSITIES-- A REVIEW

The search for a common definition of institutional research yields rather gross generalizations. It is frequently defined as the process of institutional self-study, evaluation or assessment. Anderson and Hobbs (1967, p. 117) defined it as "research leading to improved understanding, planning, and operations of colleges and universities." It might be conceived of as an expression of institutional "reality-testing." It might be, and has been, conceived of as a response to pressures from outside the institution.

It is known that "The concept of institutional research remains relatively unstructured" (Wilson, 1968, p. 1). The value of this lack of structure lies in the wide latitude in topics that are "fair game" for study and in the methodologies that might be employed. A tremendous diversity is seen of both topics and methodology on one campus at The Pennsylvania State University, and this diversity will be apparent to the reader as he continues.

Several important conceptions of institutional research have been suggested. Rourke and Brooks in *The Managerial Revolution in Higher Education,* (1966, p. 44) suggest that "...it can be said that institutional research is a variegated form of organizational self-study designed to help colleges and universities gather an expanding range of information about their own internal operations and the effectiveness with which they are using their resources (p. 44)." Stickler (1968, p. 3) uses the following definition "...institutional research refers to research which is directed toward providing data useful or necessary in the making of intelligent administrative decisions and/or for the successful operation, maintenance and/or improvement of a given institution of higher education." Dyer (1966) presents an intriguing definition that seems to capture both the essence of institutional research and some of its basic dilemmas. He suggests, "One can usefully conceive of institutional research as that activity in which the mission orientation and the discipline orientation of a college or university intersect (p. 456)."

Whatever the institution must know about itself in order to accomplish its mission is an appropriate subject for institutional research, and this assertion contains implications that several variables are significant. First, there is the question of what the institution is trying to accomplish. The literature on higher education provides some reason to believe that goals are difficult to define and that there may be some disagreement over them. It might be anticipated that a basic tension exists in terms of whether institutional research will evaluate the effectiveness of the university's operation, which implies a relation to goals, or the efficiency of its operation. That is, should output be measured against goals and standards or should efficiency of production be measured?

Second, there is the ever-present question of epistemology. How does one come to know? What methods will provide valid answers to the questions an institution asks of itself? Who is asking the question and

is the question appropriate? Institutional researchers are charged with the responsibility to produce knowledge and must at least be sophisticated in terms of the epistemological debates that occur among scientists, humanists, eclectics and others. What is acceptable to one group within a university may be rejected by another group as "hearsay" or "irrelevant." Because a university is governed by so many different people on so many different issues, it is inevitable that disagreement will arise concerning what is fact and what is not.

Dyer (1966, pp. 465-466) has offered a cogent point suggesting that:

> One of the functions of institutional research ...is to keep reminding those who operate colleges and universities, both faculty and administrators, that most of what they do as educators is in fact based on blind assumptions that could turn out to be *wrong*. Perhaps, for the time being, this is its most important function. For as things now stand, we do not really have a science of institutions, whether we think of science as a body of organized facts or as an organized search for explanatory concepts.

The institutional researcher functions in the face of these ambiguities, conflicting definitions, and pressures for answers. His is a sensitive and important position. He is charged, at the very least, with providing information required for decisions made within the institution about the institution's practices and policies.

The matter of how one institution organizes to provide this information will be considered in the papers that follow, with Penn State's organization for institutional research being presented as one possible approach. The concluding essay will discuss the implications of this particular mode of operation.

## Brief History of Institutional Research

An examination of the history and development of the institutional research function in American higher education yields differing pictures according to how one defines institutional research.

W.H. Cowley, in "Two and a Half Centuries of Institutional Research" (1959), a paper delivered to the conference on institutional research, traces the origins of the functions to the early 1700s and the founding of Yale. He proceeds with an historical survey of what might be called "self-studies," as these were performed at colonial colleges, and marks later events that had significant implications for the eventual emergence of a more sophisticated process. He notes, for example, the trend toward the keeping of quantitative records that emerged in the latter half of the 19th century with the first United States census in 1870, and the survey of college enrollments conducted by Frederick Barnard, president of Columbia University, in the same year (p. 5).

Perhaps the most significant historical development for all of educational and behavioral research was, of course, the emergence of modern statistics near the turn of the century (Cowley, 1959, p. 56). The period from 1910 to the mid-1920s appears to have been a time of rapid assimilation of statistical tools into the vocabulary of American education.

Formalized behavioral research began to emerge in the period from 1910 to 1920 with the establishment in school districts and in universities of "bureaus of educational research," and "bureaus of investigation and appraisal" (Barr, 1960, p. 1163). The Bureau of Educational Research at the University of Illinois reports an extremely lengthy bibliography (more than 3,000 items) of significant pieces of research on educational problems for the period 1918-1927. It is interesting to note that studies on higher education were far outnumbered by studies on elementary or secondary educa-

tion during that period. Further, some of the titles indicate that very interesting "institutional research" was being conducted at that time--nearly 50 years ago. For example, some of the titles include "A Statistical Study of Some Aspects of the Purdue Orientation Testing Program," "A Critical Analysis of Student Persistence at the University of Illinois," "Report on Questionnaire Study of Opinions of Alumni of the University of Minnesota Concerning Courses and Methods of Teaching used with Freshmen and Sophomores," "University Problems, and Uniform Methods of Calculating the Per Capita Cost of Education (Monroe, Odell, Herriott, Engelhart and Hull, 1928)."

Consciousness of the necessity for conducting self-study was sharpened during the 1920s. This is evident from the formation of the Committee on Educational Research by President Coffman at the University of Minnesota in 1924. This committee, which was later to become Minnesota's excellent Bureau of Institutional Research, was formed "to promote the study and investigation of educational problems within the university" (Stecklein, 1968, p. 31). The University of Illinois also founded a Bureau of Institutional Research in 1918, and Purdue followed Minnesota's example in 1925 (Cowley, 1959, p. 13). Further, it appears evident that the "scientific" approach to education had taken a firm hold at the elementary and secondary levels by the mid-1920s. F.J. Kelley, writing in 1924, suggested that colleges and universities capitalize on the advances in administration and instruction that had been seen in lower schools as a result of the application of a scientific approach. He offered the observation that colleges and universities had not, to that time, been disposed to engage in scientific self-analysis (p. 390).

Perhaps, the first clear external pressures on individual institutions for a quantitative accounting of their operations came from the North Central Association of Colleges and Secondary Schools in the early 1920s. The association set quantitative standards for accreditation and required detailed records from each institution of such criteria as the faculty-student

ratio, training of the faculty, teaching loads of all faculty, records of class size, library size and expenditures, proportional contribution of endowment to operation, proportion of juniors and seniors in the undergraduate population, and other elements. Further, it set as overriding criteria for accreditation, "The character of the curriculum, the efficiency of the instruction, and the scientific spirit ...." (NCA Quarterly, 1926, p. 20). In order to enjoy accreditation, an institution was *required* to make provisions for knowing its own operation in quantitative terms and to be concerned with efficiency. This appears to have been one of the most significant developments in the emergence of the institutional research function. It is especially interesting to note that the pressure for information was from an extra-institutional source.

Very little was written about institutional research over the ensuing 30 years from 1925-1955. The reasons for this are not entirely clear, but may stem from the preoccupation of colleges and universities with stark problems of survival and solvency during the depression and war years. Undoubtedly, some interesting institutional research was performed during this period, but it is unlikely that many colleges and universities could afford to preoccupy themselves with sophisticated experimentation. Cowley has noted the lapse in self-studies as some of the leaders of the movement from the 1920s retired or changed their interests between 1925 and 1945. (Minnesota may have been an exception.) He further suggests that the period from 1945 to 1959 was marked by only minor developments in institutional research (Cowley, 1959, pp. 14-15). This latter period remains somewhat enigmatic; it is difficult to provide any thorough historical accounting of reasons for the continued dormancy of the institutional research field.

A resurgence of interest in institutional research occurred near the end of 1950s. The University of Colorado, for example, formed an Office of Institutional Research in 1956; the University of Wisconsin did so in 1957; and the Western Interstate Commission for Higher Education conference on institutional research

was held at Stanford in 1959. "A decade ago (1958) there probably were not more than a score of bonafide institutional research offices in the entire country." But in 1968,"...institutional research offices (were) probably numbered in the several hundreds" (Stickler, 1968, p. 1). The Association for Institutional Research (A.I.R.) was formed in the early 1960s, finally giving a professional identity to an activity that had long been a relatively invisible aspect of the management of American colleges and universities.

The last decade (1960-1969) represents a time during which colleges and universities have assimilated the techniques and the developing body of literature of institutional research into their operations. The dissemination of both has been formalized with the regularly published proceedings of the A.I.R.. A cursory analysis of types of studies concluded in recent years yields some interesting patterns. Five general areas seem to have received the bulk of attention including administrative and management problems, the student, environmental characteristics, curriculum and instruction, and faculty.

Probably, the most examined area is that of administrative and management problems. Miller (1968, p. 109) states that some of the first significant examinations in this area were conducted in the 1930s by what he calls "The Chicago School"--Floyd Reeves, John Dale Russell, A.J. Brumbaugh, and Lloyd Blauch, for example. Specifically, he refers to broad-scale studies conducted by this group as a way of providing "...normative information about institutional organization, administration, finance, curriculum, staffing, physical plan facilities, and many other matters" (p. 109). Rourke and Brooks (1966) discuss more recent trends, offering an incisive if somewhat controversial view of the "managerial revolution", which has brought the methods of administrative science, systems analysis, and the like to bear on academic administration. Space utilization studies, enrollment projections, facilities planning, systems studies of management operations, and various kinds of budgetary analyses and projections

have all become elements of some institutional research programs.

Not only has the administration benefited from a broad range of studies, but Boyer (1967, pp. 3-20) suggested it benefited most in terms of direct impact made by the results of studies. He cites facilities studies involving inventories, evaluations, projections, and planning, cost analysis studies, and student enrollment and transfer studies as three specific contributing factors to important and direct alterations in institutional practices.

Boyer is not as charitable about the impact of the other types of studies. He is specifically critical of the noticeable lack of effect of findings in the area of curriculum and instruction: "Overall, ..., there is no firm evidence to suggest that older instructional practices have given way to other models, even though facts seem to indicate beyond reasonable doubt that such changes would be educationally and financially advantageous" (p. 11). He cites as one example the findings that televised instruction can be as effective as, but more efficient than, regular classroom lectures. Yet, televised instruction has not been implemented on a broad scale. Another point he makes is that many studies on curriculum and instruction are conducted as surveys, rather than as productive experiments (p. 13). It is, of course, very difficult for several reasons to "experiment" with instruction. Traditions of academic freedom deny the investigator sufficient access to the classroom. Also, one recoils in anticipation of lawsuits filed by students who might be randomly chosen to enjoy the pedagogical neglect involved in control group membership, or by those students in an experimental group who may have suffered a detrimental experience. Serious experimentation could be performed, but the obstacles are formidable.

Also, it is somewhat unfair to suggest that there is a complete vacuum of responsible research on curriculum and instruction. Stephens College in Missouri

has long been noted for its efforts in this area, and Purdue and Penn State, as examples, have supported research programs on the instructional process. Although important research has been conducted at such diverse institutions as Antioch, Oberlin, Miami University, New York University, University of Michigan and San Francisco State University (McKeachie, 1962), in general terms, the impact of institutional studies in this area remains small.

The last decade has seen a considerable volume of research on the student and on institutional environments as they affect students. Research on prediction of academic achievement continues to be a major focus of much effort, as it has been for approximately 50 years. A number of studies have concentrated on dropouts, for example those done by Nasatir (Summerskill, 1962, p. 627). Attitude surveys, studies of a variety of student characteristics, and student evaluations of professors and course instruction are commonly reported activities. Indeed, research on the student and his curricular and extracurricular experiences and characteristics has produced in recent years a volume of research comparable to that produced on administrative problems.

It is obvious that data on students is both voluminous and accessible. The admissions process yields information on virtually every student's past achievement record, his measured abilities, and more subjective evaluations of his capacity. During a student's college career, an accumulation of grades, disciplinary records, interest inventories, and many other kinds of information become part of an accessible and statistically manageable "dossier," which is frequently kept on computer cards or tapes. Students represent a "captive" population about whom the creative researcher can learn a great deal with relatively little effort. What should be known about students is of course subject to a continuing ethical and legal debate. Student personnel administrators, particularly, are constantly faced with ethical dilemmas in which they have a great deal of information available to them, but little in-

clination to sacrifice what they consider a confidential relationship characterized by professionally privileged knowledge and the "client's" (student's) right to privacy.

Undoubtedly, too, it would be irresponsible to neglect to learn, in good faith, what is possible about students and their relationship to the college. It would be absurd to effect and maintain institutional practices that ignored student characteristics.

Significant contributions to a conceptual base for further research have been made, for example by Pace and Stern with their work on college environments (Feldman & Newcomb, 1969, p. 355); Knoell and Medsker (1965) with their study of junior college transfer students; by Astin, Panos, and Creager (1967) with their study on characteristics of entering freshman; by Astin alone on talented students; by Nevitt Sanford who undertook a massive compilation of papers in 1962, which contributed to widely separate areas of knowledge about students and the college *(The American College: A Psychological and Social Interpretation of the Higher Learning)*; and by many others too numerous to begin to mention.

Studies of faculty form another category of important institutional research conducted over the last decade. Faculty attitudes, characteristics, practices, and their participation in governance represent some of the areas that have been subjected to study.

Probably the most studied aspect of faculty life is the "work load." It should be added that perhaps no area is subject to more disagreement. John Stecklein of the Bureau of Institutional Research at the University of Minnesota has as much as anyone contributed to standardization of the measurement of faculty activity. The numerous and extremely diverse kinds of "work" that a faculty member performs are not subject to simple quantification. For example, how are teaching tasks including preparation, lab supervision and evaluation adequately evaluated in such dif-

ferent fields as physics and art? It is apparently not satisfactory to measure teaching hours alone, for many faculty members spend much necessary time on such other activities as advising, research, committee service, and the like. As Stecklein (1959, p. 39) points out, "The faculty time devoted to these additional activities is important, not only from a faculty viewpoint, but also from the point of view of the costs of the various functions served by the institution." This suggests that the university will better understand its own character and range of functions if an accurate representation of faculty activity can be composed. More important is the suggestion that an awareness of faculty activity will provide a better grasp of how institutional resources are allocated. As will be suggested later, pressures for public accountability are being brought to bear upon universities, and effective accounting for resource allocation will be a major concern for a period of at least several years in the foreseeable future.

Concern for systematic measurement of teaching load can be traced back at least to a bulletin issued by the U.S. Office of Education in 1919 (Koos, 1919). The concern has been present ever since that time (See Knowles & White, 1939; Stecklein, 1959), but it is apparent that no entirely satisfactory system has been developed for this kind of evaluation. Further, it is likely that variances among institutional situations will mitigate against the utility of any system that does not at least account for institutional type. For example, measuring the work load of a community college faculty member who concentrates on teaching appears to involve different assumptions than would measurement of the work load of a university faculty member whose main concern is research.

There seems to be a plethora of hortatory literature, pleas for implementation of findings and a feeling that a job is not quite fully successful, haunting the history of institutional research. The institutional researcher also seems dogged by frustration.

Boyer (1967, p. vii) suggests that we have little knowledge of the impact of self-studies on "...collegiate life generally and the academic program in particular." He goes on to suggest that in some areas -- curriculum, for example -- present practices actually ignore the realities suggested by research findings. Anderson and Hobbs (1967, p. 117) offer the conclusion that not only do institutional researchers face questions about "what they ought to be doing," but they also must contend with a wider ignorance of what they "are doing." At present, then, there is a lack of a clear sense of where institutional research actually began (colonial days? 1918? 1960?) and a feeling that it is a "calling" still only roughly defined. The imminence of millenial events that will secure and define the function once and for all can still not be completely justified.

Although it is apparent that conceptual reference systems and adequate methodologies are still being sought, the work of the institutional researcher has a well-established place in higher education. Colleges and universities are in a position that demands accurate and adequate self-knowledge, both for internal purposes relating to institutional development and to meet the political test that confronts them with demands for stricter public accountability. Seeking knowledge about institutions of higher education has long been an important activity, but it may soon be a critical one in a test of survival.

Thus, institutional research must be defined in broad terms as all attempts, by whatever methods, of an institution to know its inputs, its operations, and its outputs. The literature does not indicate that a more restrictive definition is appropriate, nor can any way that people "know" be ignored in the midst of an era of serious questioning. It seems necessary at least to recognize the need for imaginative and creative approaches to the art of institutional self-study, which will not be restricted to one methodological school or another.

The history of institutional research is only vaguely visible, but it is known that organized efforts began in the 1920s. Yet only within the last decade has it become a widely accepted part of normal college and university operations. The evidence with regard to the impact of self-studies on institutional operations is conflicting. It seems clear that too little is known about the organization and effectiveness of institutional research efforts, and it is hoped that this volume will contribute to an understanding of the nature and results of one institution's efforts to study itself.

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# INSTITUTIONAL SELF-STUDIES BY THE OFFICE OF THE VICE-PRESIDENT FOR PLANNING

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Office of the Vice-President for Planning

## SUMMARY

The vice-president for planning and his staff coordinate and direct the preparation of program plans and budgets for the university; develop, implement, and improve planning processes; provide data to university administration for planning purposes; provide the president of the university and other administrators with cost-benefit data; and prepare capital and operating budget requests and justifications. Among the projects discussed are the development of five-year plans, the development of an instructional activity model projecting student flow within and across instructional units of the university, and the initial activity concerned with the development of a management information system for the university. Emphasis is placed on the need for an effective planning activity as a response to tighter external controls being placed on universities.

# INSTITUTIONAL SELF-STUDIES BY THE OFFICE OF THE VICE-PRESIDENT FOR PLANNING

This office was originally established in 1957 as the Office of the Vice-President for Development by action of the Board of Trustees, which specified that the incumbent "shall be responsible to the President of the University for the coordination of all general economic and long-range planning for the development of the University." The title was changed to the Office of the Vice-President for Planning on June 1, 1967.

The vice-president is the ex officio chairman of the Committee on University Planning and Development, which has as its major concern the role of The Pennsylvania State University in the educational programs of the state and the nation, and the possible courses of action the institution may take to fulfill this role. Subcommittees deal with the specific areas of instruction, research, public service, coordination of academic planning, and the planning of structures and facilities required to support the university's programs.

Among the primary responsibilities of the vice-president for planning are the coordination and

direction of program plans and budgets for the university as a whole and for its major organizational units, and the development, implementation and continual improvement of processes for planning for the university and its constituent parts by conducting and sponsoring research on the nature and methodologies of planning. Studies include the use of models, analysis of other systems, development of quantitative measures of performance and output, and the design and application of appropriate planning techniques. This office also provides data and analyses to university administrators to assist them in sensing future environments, assessing needs of society, and understanding the characteristics and performance of the university and of the units for which they are responsible. Cost-benefit data on the various options to be considered in resolving important issues, in instituting new programs, and in changing existing patterns are also provided to the president and decision makers within the university. Additionally, capital operating budgets are prepared on request.

There are, at present, eight professional members of the office, including the vice-president. Supporting these professionals are five full-time and two part-time staff members.

The organizational chart (Appendix A) indicates the major areas of effort. Institutional research is conducted in each of the operational divisions shown on the organization chart as one important means of developing and continuously improving a dynamic program of university planning. To be effective, research must bear upon all aspects of the process including a continuous sensing of the ever-changing environment and the shortening of response time in meeting changing needs; providing guidelines for the evaluation of existing programs and consideration of new ones; justification to funding agencies of the priority needs required to meet short- and long-range objectives; and guiding the orderly and rapid development of the Penn State system statewide.

The character of institutional research performed in the Planning Office varies not only with the area of effort as indicated above, but also as it relates to long- and short-term activities illustrated in the diagram entitled "Planning Activities" (Appendix B). Strategic planning, because it commonly focuses upon long-range objectives, permits the development and implementation of more sophisticated and time-consuming research efforts than can be brought to bear upon the daily and weekly problems which, though more immediate in nature, nonetheless require the acquisition, collation, and analysis of appropriate data. Thus, although strategic planning, program planning and budget planning all depend upon supportive research, the character of the research effort is highly dependent upon the time span involved.

## Major Current Projects

### Development of Five-Year Plans

During the past year and a half, the office has become increasingly involved in working with deans, department heads, and campus directors to develop fairly detailed estimates of programs and enrollments, as well as the manpower and facilities to handle them. This process began with "Planning Packets" that were distributed to every academic administrator at the level of department head or higher. These were designed to introduce to the majority of the university's academicians the kind of thinking and data requirements that are necessary for good planning. They also served to establish communications links with the Planning Office. As expected, there was a wide variety in the type of response, with quality and usefulness generally proportional to the amount of planning the units had previously done on their own.

Data from the packets were combined with requests for new programs, with deans' budget requests, and with estimates by college of the number of students that Penn State would be expected to enroll, if the

ratio of admissions to high school graduates persisted, and if the latest estimates by the State of Pennsylvania for high school graduates were unchanged. Consideration was also given to the space that would be available for academic purposes if the university's capital program requests to the state were approved and funded. One result of this effort was the preparation of five-year (1970-1974) resident enrollment targets by year, student level and college.

An important point repeatedly emphasized in all of the negotiations related to these five-year plans is that they are subject to change--only the earliest fiscal year is relatively fixed. Since there are many variables that must be tied into program planning, and since this kind of planning should be continuous rather than sporadic, annual revisions are mandatory.

Instructional Activity Model

The instructional system of an institution of higher education may be thought of as a series of interconnected flows of activities (an input-output model), measured on some common basis such as credits, semester hours and course units. The input to the system is initiated as a result of students enrolling in the various programs of study offered by the institution. Input is then related to output by a series of coefficients that describe quantitatively the distribution of input along prescribed paths. Given a forecast of input activity for each broad discipline area, as represented by the colleges, it is possible to project the instructional work load imposed on each college by course level.

Using this model in conjunction with others developed previously on the flow of students, it is possible to vary the controlling parameters to reflect various assumed conditions and to project admissions, enrollments, internal transitions from one college to another, degrees awarded, and instructional work load.

## Management Information System

For an institution of Penn State's size and complexity, up-to-date information is essential for effective management and planning. Despite the fact that the university has a fairly advanced system for data collection, there still is a great deal of duplicated effort in compiling various statistics, and little coordination between the offices that develop them.

Consider the element of financial support that the university provides to students. This can take many forms such as scholarships, loans, grants, and direct employment. At the undergraduate level, records for all types of support are available through the Office of Student Aid. Information about graduate students holding teaching or research assistantships, however, is kept by the individual departments. Thus the only way the university can determine how much of its money is used to support students in any given term is to turn to a combination of payroll records and transfers from its own scholarship, loan, and grant accounts.

The complexity of the problem prompted the president to call for a definition of Penn State's "management information system" as it stands now, and recommendations about the configuration it ought to have. In January 1970, Dr. Charles M. Mottley, special assistant to the vice-president for planning, was asked to design an appropriate system and to make recommendations as to its implementation.

At present, decision patterns as they now exist have been defined for several functions of the university including but not restricted to new programs and changes in courses, faculty recruitment and advancement, and facility procurement and management. These decision patterns, the information they require, and the data they generate provide the basic systems concept for a University Management Information System (UMIS) proposed in a report (see below) that points the way to a more efficient and effective information

system for the university. Work has begun as of September 1970, on the design and development of an integrated management information system, and a team of systems "architects" is now engaged in the implementation of the plan, which was approved by the president in July 1970. The desired completion target dates are shown in Appendix C.

Facilities File

Currently under development is a machine-addressable facilities file from which data on the quantitative and qualitative characteristics of buildings and rooms and their assignment for use may be readily retrieved for internal administrative use.

## Projects Conducted Since 1967

The following includes a description of seven recurring or continuing projects conducted by this office since 1967. Ad hoc or one-time projects will be found listed in Appendix D.

Five-Year Academic Plans

Submission of these plans by each of the colleges, the Graduate School, and Capitol campus in Harrisburg provided some valuable insights into both the number of students that each college could accommodate and the present campus at which they are enrolled. The principal result of these five-year plans, in conjunction with several other studies, is the enrollment estimate discussed above.

Recently, the colleges, Capitol campus, the Graduate School, and the administrative units updated their five-year plans to provide the basis for compilation of the university's 1971-72 budget request to the state. These plans are more oriented toward specific programs than previous ones have been. They also contain more detailed information that permits initiation of several new performance indicators as well as more

accurate computation of a few presently in use.

Additional refinements will be made in future years, the ultimate goal being the development of an integrated planning and budgeting process based on departmental programs, perhaps even by level such as lower division, upper division, or graduate. The process implies a provision for annual revision as well as creation of performance indices that will assist in determining priorities and resource requirements.

Simulation Model

To date, three segments of the systems model on instructional activities described above have achieved a significant degree of implementation for decision purposes. As a result, the model is being used to predict instructional activity at the course level for each broad discipline area, and has been fully implemented to produce estimates for fall term enrollment five years in advance.

A Macro Student Flow model essentially projects admissions into various program levels of the university, but without regard for the discipline areas of study. At present, the relationships apply only to the total Penn State system, but sufficient work has been done to establish the feasibility of extending the concept to individual campuses.

A Micro Student Flow model projects enrollments within the university by program level and achievement level for each broad discipline group or college. The procedure depends upon development of transition rates that reflect the distribution from one year to the next of students enrolled in any given discipline area. Further work is required to establish the validity of these transition rates and to examine the effects of such "minor" flows as advanced standing transfers and readmissions.

Capital Program Budget Request

Responsibility for compilation and submission

of this annual proposal to the Pennsylvania Department of Education in Harrisburg rests in this office. Since the university's capital program (physical facilities) should properly be dependent upon the number, size and nature of academic programs at different locations, the new five-year planning efforts should do much to accomplish this, and at the same time permit more realistic evaluation, justification, and priority determination of project requests than has previously been possible. It may be necessary to extend the program planning and budget estimates to eight years, unless state requests for five-year capital program projections can be made less specific in the future.

Planning Guides

For the past 12 years, the academic and physical development of Penn State has been guided by a variety of documents that were the products of studies involving many members of the faculty and staff. Serving as the most important guide among these has been *Penn State's Future*. The general long-range plans for university growth proposed therein are still in effect, and a majority of the detailed projections have proven to be remarkably accurate.

The recently issued document, *Penn State Looks Ahead*, does not attempt to present a plan for the future. Rather, its purpose is to help set the scene for the continuous planning efforts now in process. Emphasis is placed on those many interrelated factors that deserve serious consideration in preparing future plans such as the task, the challenge of a rapidly changing world, and the changing characteristics of the institution. Because of the movement toward increased autonomy of colleges and campuses, attention is given to each of these components as well as the university as a whole. New challenges to the university are reviewed, and projections of past trends are offered to assist faculty and staff in searching out and implementing new approaches that the university must take if it is to assume the responsibilities expected of it today.

This report was written with the expectation that its usefulness will be short-lived. Given the rapidly changing environment for higher education in Pennsylvania and the nation, no planning document is likely to remain unrevised for more than a year or two at a time.

Costing of New Resident Education Programs

Once a new program request has been given approval on the basis of its academic merit or need, it comes to this office for examination on the basis of costs, resource requirements per unit of output, and so on. This evaluation, along with a recommendation, is forwarded to the vice-president for resident instruction, and is subsequently used to assist the president in making a final decision. Ultimately, it is hoped that "new program costing" can be made a fully integrated part of the annual program and budget planning process.

Potential Measure of University Performance

Development of performance measures or indices is a requisite for effective management of any system, university or otherwise. Educational performance, however, is exceedingly difficult to measure in a meaningful way that is more expressive than simple tabulations of degrees or student credit hours produced.

The percentage of degrees relative to enrollment by year appears to be a sensitive index for measuring one aspect of the performance of educational systems at all levels. The percentage may be materially improved by changes in admissions procedures or in the educational processes themselves. Similarly, increases in percentage of degrees would be a direct reflection of improvement in efficiency of the process, assuming no change in product quality. Cost-benefit analyses of such effects could form an objective basis for incorporating improvements in the educational process, making this index a useful management tool.

A thorough description and discussion of this particular index is contained in a report, *A Potential Measure of Performance for University Systems*. Additional work is being done to make the procedure applicable to more specific kinds of degrees, particularly doctoral and Master's degrees in fields other than education. (Aggregates tend to smooth individual performances, which may be of considerable importance in behavior of various university programs.) There are many possible variations in the comparisons that can be made with this basic index, depending on the data available. At least several of these will be investigated for their potential usefulness, and development of other kinds of productivity measures will continue.

## Participation in WICHE

The need for management (operational) information that is not only consistent within a single institution but which is also comparable with data from others has led Penn State to join in the management information system activities of the Western Interstate Commission for Higher Education (WICHE). With the vice-president for planning as its representative to WICHE's Management Information System (MIS) Executive Committee, the university is involved at the highest level of participation and is committed to develop its own automated information system with definitions and codings compatible with those of WICHE, and to exchange data with other participants.

# The Future of the Office

## General Statement of Responsibilities

As enrollment pressure and costs increase in the face of tightening budgets, the need for more formalized and effective planning in higher education becomes ever more apparent. In the public sector, the increasingly strong role of state coordinating boards and departments of education generates the need for more detailed institutional planning and accountability

relative to state master plans and the roles of other participants in the higher education area. Increased emphasis on program planning and budgeting requires, for many institutions, improved definition of administrative responsibility centers, development and use of automated management information systems, and appropriate measures of input, activity and output at the department or even curriculum level. Finally, the recognized need for academic planning to lead rather than follow facilities and financial planning, means that eight-to-ten-year, rather than five-year, academic planning periods must become the rule rather than the exception.

In consideration of these and related prospects, it seems apparent that the planning function within institutions like Penn State must become an increasingly important part of the "daily" concern of administrators, faculty and students. It is expected that the Office of the Vice-President for Planning will grow and extend its responsibilities as necessary to support and coordinate all planning efforts in order to assist properly in the continued development and success of the university. Institutional research within and sponsored by the office will increase in amount and importance if this unit of the central administration is to serve the other components of the university adequately.

Studies That Should Be Made

Multi-campus model. Develop and implement for operational use a mathematical model that will forecast the exogenous demands imposed upon a multi-campus university and simulate the response of the institution to these demands. Such a model should enable an administrator to test the effects of various policies and plans upon the allocation of resources among the major organizational units of the institution.

Physical facilities. Develop a methodology for determining needs for the conversion and addition of facilities. This space management project will be closely related to, and is expected to become an

integral part of the on-going program planning system. It would thus provide a sound basis for compilation of the university's capital program budget requests.

Needs of society. As an outgrowth of, or in conjunction with, the work now being done on development of a master plan for education in the Commonwealth of Pennsylvania, establish some relatively specific means for estimating the present and future needs of the state and the nation for the university's "products." This would help the university's administrators to look more objectively at its various programs and to distinguish those that require continued or increased support from those with diminishing usefulness.

Output evaluation. For simplicity's sake, the university system can be through of as a "black box" for which there is an imput (enrollments) and a corresponding output (graduates or better-educated persons). Studies of the workings within the "black box" are numerous and will be more so. Of equal, if not greater importance, however, is the need to devise quantitative measures of output quality and to relate the quality of output to input. This could lead to input controls that would tend to optimize output.

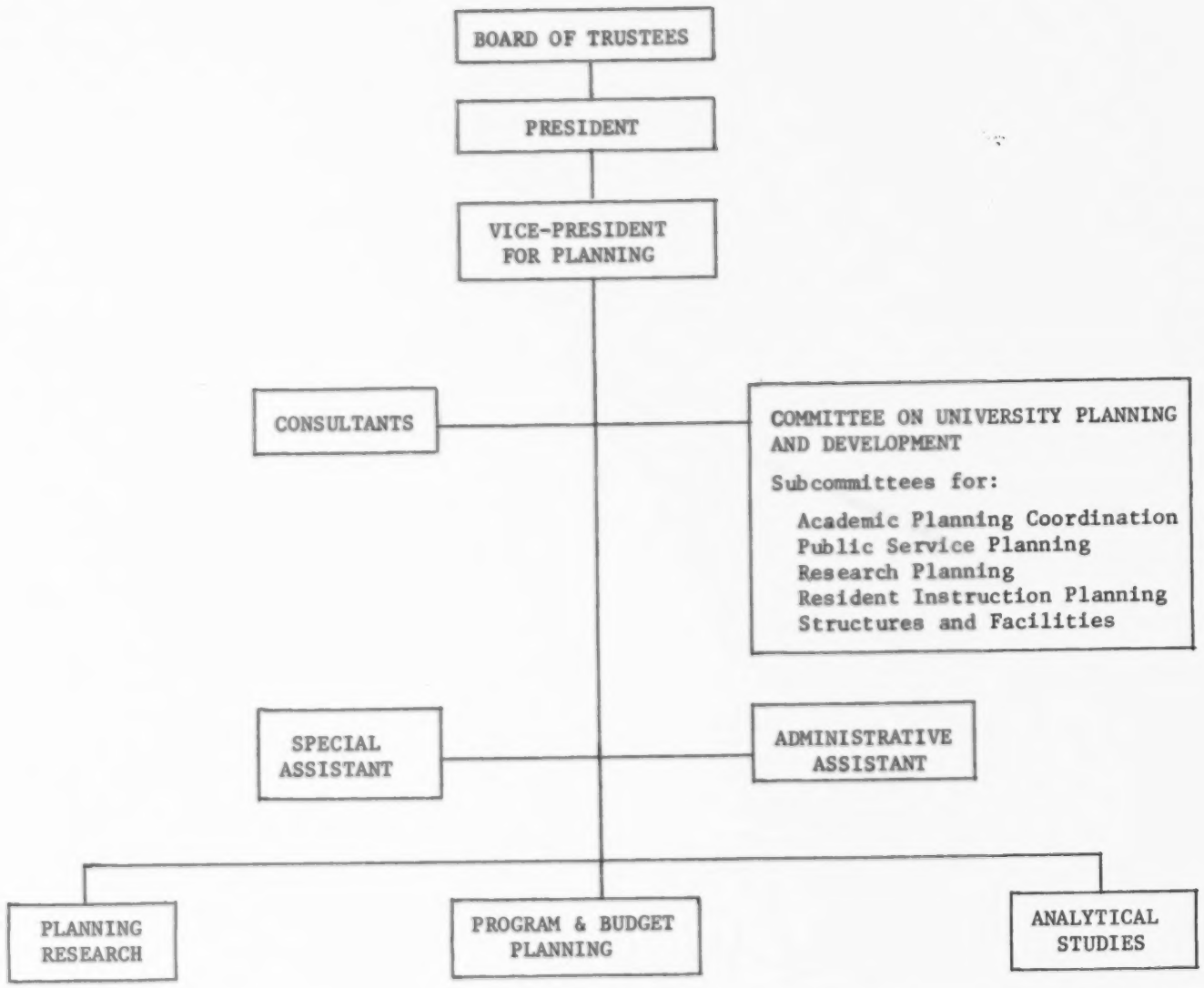
Further examination of the "black box" would also be required so that changes could be implemented if it were decided to put less emphasis on output specialization and more on flexibility; to adopt a university posture that is optimal for a variety of possible future events instead of maintaining one that required ad hoc short-term adjustments; or to stress interchangeability among programs.

Concerning UMIS. As work on the development of the University Management Information System for The Pennsylvania State University progresses, many and varied studies and reports will be produced that could properly be classified as "institutional research." Although the primary responsibility of this office will be to coordinate these studies and reports, some of them will no

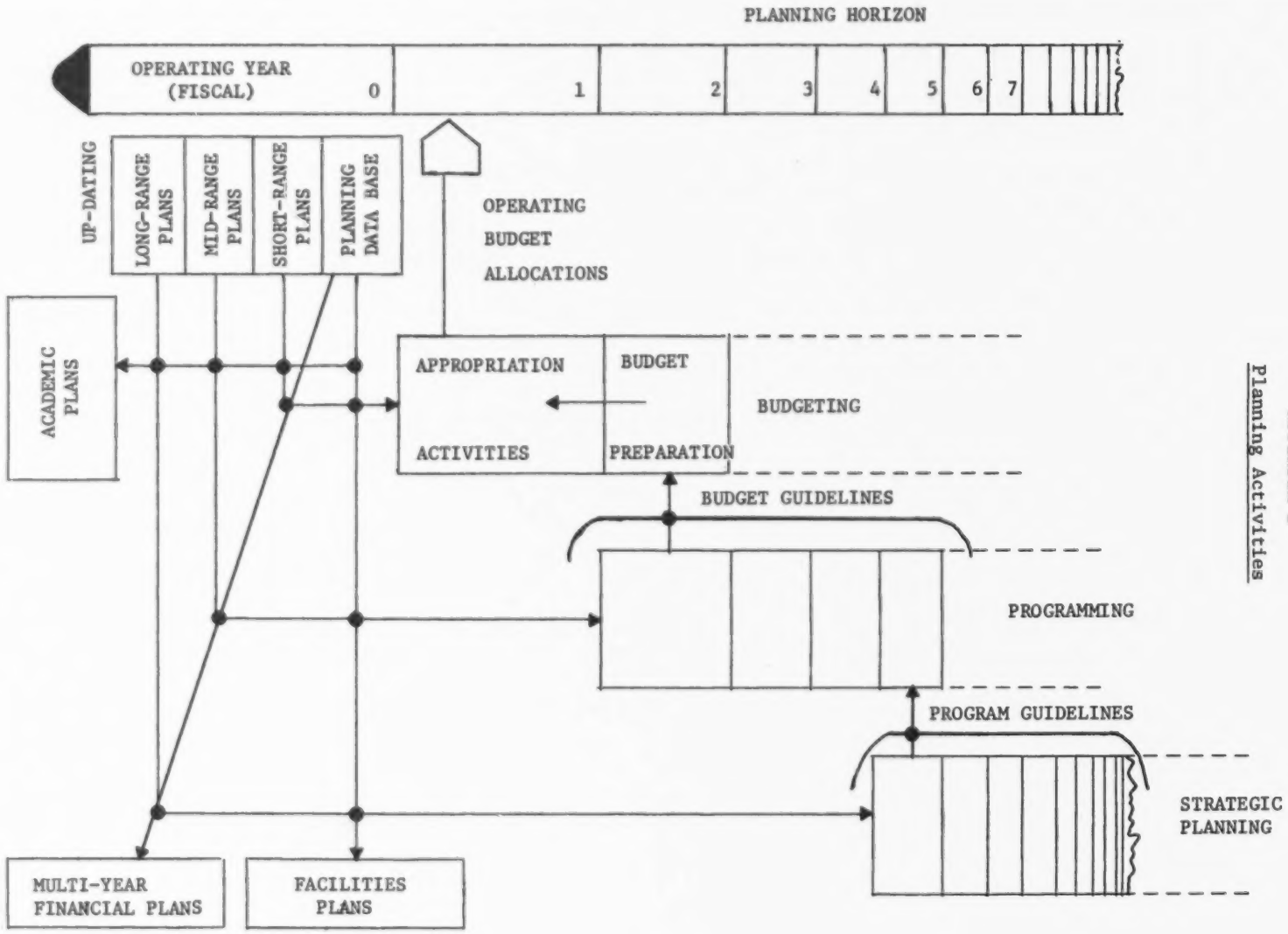
doubt be done by members of the staff. Just which subjects will be covered has not been defined to date. Representative possibilities could include the determination, definition, and classification of decision points within the overall system, as well as periodic revision of the guidelines within which the system must operate.

APPENDIX A

Organization for Planning



APPENDIX B
Planning Activities



APPENDIX C

Completion Target Dates for the University Management Information System (UMIS)

| | UMIS SUBSYSTEMS (ss) | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|---|---|---|---|---|---|---|---|
| | | 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 |
| A | **Transactional Data Base** | | | 1 → 2 → 3 → 4 | | | |
| | ssa. Student | | 1 | 2 3 | 4 | | |
| | b. Financial | | 1 2 | 3 | 4 | | |
| | c. Activities (Programs) | | 1 | 2 | 3 | 4 | |
| | d. Manpower (Personnel) | | | 1 2 | 3 4 | | |
| | e. Facilities | | 1 | 2 | 3 | 4 | |
| | f. Support (Business) | | 1 | 2 | 3 | 4 | |
| B | **Planning Data Base** | | | 1 → 2 → 3 → 4 | | | |
| | ssa. Enrollments | | 1 2 | 3 4 | | | |
| | b. Flow Patterns (Models) | | 1 | 2 3 | 4 | | |
| | c. Programs | | 1 | 2 | 3 | 4 | |
| | d. Resource Requirements | | | 1 | 2 | 3 | 4 |
| | 1) Budgets | | 1 | 2 | 3 | 4 | |
| | 2) Manpower | | | 1 2 | 3 | 4 | |
| | 3) Facilities | | 1 | 2 | 3 | 4 | |
| C | **Research Data Base** | | | 1 → 2 → 3 → 4 | | | |
| | ssa. Activities | | | 1 | 2 | 3 | 4 |
| | b. Resources | | | 1 | 2 | 3 | 4 |
| D | **External Data Base** (State and Nation) | To be designed and developed with the schedule depending on availability of UMIS resources. | | | | | |
| | ssa. Higher Education | | | | | | |
| | b. Economics | | | | | | |
| | c. Demographic | | | | | | |
| E | **Historical Data Base** | | | 1 → 2 → 3 → 4 | | | |
| | ssa. Student | | 1 | 2 | 3 | 4 | |
| | b. Financial | | 1 | 2 | 3 4 | | |
| | c. Manpower | | | 1 | 2 | 3 | 4 |
| | d. Facilities | | | 1 | 2 | 3 | 4 |
| | e. Activities | | | 1 | 2 | 3 | 4 |

**Planning Phases**

1. **Design Phase**

The subsystems concept is defined in terms of the 1) decision pattern to be serviced 2) the generalized concept of the data acquisition, input, processing (thru-put), and output (reports) required 3) the hardware configuration 4) the software requirements, including control elements 5) compatibility of the subsystems 6) timeliness.

2. **Development Phase**

The concepts defined in Phase 1 are translated into completed specifications and blueprints for the implementation of the subsystems and their components.

3. **Installation Phase**

The specified components are installed and tested. The education and the users and service personnel are included in this phase.

4. **Operational Phase**

The new subsystems are put into operation replacing those in current use.

APPENDIX D

## Ad Hoc or One-Time Projects Conducted Since 1967 by the Office of the Vice-President for Planning

The following is a list of reports describing various information-producing projects that this office has conducted. The listing is chronological, rather than according to priority or importance, and the results and utilization of one or two are discussed briefly.

1. Statements Describing the Missions and Operations of The Pennsylvania State University (March 1968).

   For quite some time, the university has been functioning under a set of operational "rules," the origin of which is not clearly stated. An attempt was made to single out some of the rules that related to the fundamental missions and operations, to determine their sources (Board of Trustees action, executive order or tradition), and to combine them in a reference document that would permit identification of those "rules" that could be changed at some administrative level and those that would require action of the Board of Trustees.

2. An Analysis of the Distribution of Student Credit Hours among the Colleges at the University Park Campus (November 1968).

3. An Analysis of the Distribution of Student Credit Hours for Each Campus of The Pennsylvania State University (December 1968).

4. An Analysis of the Distribution of Student Credit Hours for Each College of The Pennsylvania State University (January 1969).

5. Development of Upper Division Capacity for The Pennsylvania State University (February 1969).

This study was done to make explicit the problem developing as a result of the increasing number of high school graduates; the university's "tradition" of accepting about 14 percent of the graduating class; the need to provide facilities sufficient to handle 24,000 lower-division baccalaureate students by 1975; and the limit of 8,000 of these students at University Park.

Several options were put forth and examined with respect to site, facilities, and faculty capability (current and potential). The result was a recommendation to the Long-Range Development Committee of the Board of Trustees that the Behrend and McKeesport campuses be developed as four-year campuses of the university.

6. Projections of Student Flow in The Pennsylvania State University System (June 1969).

7. The Pennsylvania State University: 1970-1975 Guidelines for Planning (July 1969).

This report started with the mission and guiding principles of the university and then used a modified Delphi technique* to establish the assumptions under which planning for the future might take place. The resulting "Program Policy Guidelines" provide some valuable ideas about a possible university configuration for the future.

8. Projections of Enrollments and Degrees Awarded by College of The Pennsylvania State University, 1970-74 (September 1969).

9. Projected Distribution of Student Credit Hours

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*"Delphi technique" refers to a standard process for synthesizing the opinions of experts which avoids face-to-face discussions among the respondents.

among the Colleges of The Pennsylvania State University, 1970-74 (September 1969).

10. A Potential Measure of Performance for University Systems (February 1970).

11. The Impact of Community Colleges upon Admissions to Upper Division Institutions in Pennsylvania, 1970-75 (April 1970).

This study is an outgrowth of the work done to determine overall demands on The Pennsylvania State University system produced by growing numbers of high school graduates in Pennsylvania. The study looks at the patterns of freshman admissions by county, projects them through 1974, and combines them with data on current enrollments to estimate the total number of baccalaureate and associate degree students from any given county for any given year. Students are identified by college and by their term in the university, but not by location. Graduate students are excluded, due to the significant percentage coming from out-of-state.

12. Penn State Looks Ahead (June 1970).

13. Outline Plan for the Design and Development of the University Management Information System (June 1970).

# INSTITUTIONAL RESEARCH AND THE CONTROLLER'S OFFICE

*Steve A. Garban*
Deputy Controller

## SUMMARY

The Controller's Office is responsible for the variety of accounting activities of the university necessary to receive and dispense funds in accordance with university policy and acceptable accounting practices and procedures. This includes organizing data to explain, justify and account for the university's fiscal needs and expenditures. It follows that the office must aid in finding the most efficient and appropriate uses for the limited resources available. To this end, the controller has within his organization a separate group -- the Studies Department -- reporting on special topics, such as cost studies, space utilization reports, and comparative academic salaries. Ad hoc reports are also prepared upon request.

# INSTITUTIONAL RESEARCH AND THE CONTROLLER'S OFFICE

In recent years, institutions of higher education generally, and Penn State specifically, have been confronted with demands for "cost justification," "cost control," and "fiscal accountability," as expressions of a growing public emphasis on financial awareness.

From a national viewpoint, the rapidly changing mood of society is a contributing factor, with the general public calling for higher education to search beyond technical and scientific matters toward the study of the social and human problems confronting the world. Young people are demanding, sometimes violently, a more meaningful and relevant education, and universities are now faced with providing for the demonstrated needs of society.

One of the ways a university can insure a more meaningful education for its students is to constantly review existing programs and priorities, and instrumental in these reviews are cost and finance-related matters. Costs of past programs and of pro-

jected programs are of major importance when decisions need to be made. Additionally, the increasing costs of obtaining an education, coupled with a constant drain on the taxpayer's pocketbook, have resulted in pressures upon legislatures and government officials for justification of tax dollar expenditures. As one of the major recipients of funds from the Commonwealth of Pennsylvania, Penn State is subjected to pressure for fiscal justifications, which will increase as the size and complexity of the university budget grows. The university must be prepared to meet these pressures if it is to keep pace with the educational needs of society.

Another factor contributing to increased accountability for the management of public finances is that the incremental system of justifying financial requests is no longer acceptable or effective. This approach justifies only the additional funds requested beyond the most recent budget or fiscal year, with little consideration given to programs currently funded. Until recently, it was assumed that current programs were appropriate and they were funded at the same level in the following year. This notion, however, has given way to the total budget concept, with formula approaches for requesting funds and Program Planning Budget Systems (PPBS) introduced as possible alternatives.

Both of these methods attempt to measure how effectively current funds are being used. They are essentially cost studies. PPBS identifies the total budget by programs, by projecting in the future, by providing alternative programs, and by attempting to measure the actual accomplishments or outputs of the programs. When one considers the size of the university and its branch campuses, the great need for effective, efficient, decentralized management becomes apparent as does the need for constant review of the established programs and priorities. Consequently, it becomes important that sound and effective management information systems be developed to augment the managerial

capabilities of deans and department heads. It is hoped that outputs from such systems will aid in providing timely studies and financial data that will be useful tools in decision making.

## Institutional Self-Study

In its various elements, institutional self-study is an integral part of the normal operation of the Controller's Office and the accounting system. The Accounting Division systematically collects and records many kinds of financial data as a matter of procedural routine, and these are then complied and stored in computers by the Data Processing Service. These are readily made available for reporting the managerial purposes, such as the use of monthly or annual reports in the administrative functions of self-study, management, and control.

Among these reports is one that includes an analysis of the various departmental budgets, itemizing and summarizing income, expenditures, and encumbrances against amended budgeted amounts. Unencumbered balances left for the remainder of the budget period are also shown. A "Distribution Report" summarizes these items by department, college or major division. Other reports prepared monthly include the traditional accounting reports -- Trial Balances, the General Ledger report, and various payroll reports. These are all part of the internal study of the financial operations of the university, and they culminate in the annual report of the controller. They are also used for preparing management reports upon request. Reports that have been requested include a fringe benefits study, an analysis of expenditures, a study of the sources of funds for resident instruction and research, extra compensation lists, various salary studies, and a number of production and cost studies.

The Studies Department, which performs these analyses, consists of a department head, six staff

members and a secretary. Its primary function is the preparation of a variety of studies for use as administrative management tools. These include analyses of academic services and direct costs performed each term; a study of graduate assistantships as well as fellowships; an analysis of sabbatical and graduate study leaves; a report on space utilization of instructional rooms; an annual academic and non-academic salary and birth date study; an investigation of employment dates; a credit costs analysis by level of instruction; a degree study; and a count of teaching faculty, performed each autumn. (A full description of these studies is presented in Appendix A.)

These studies, currently being conducted by the Controller's Office, are presently under review to determine their usefulness in light of the developments already mentioned concerning budget requests and management information needs. In this review, great emphasis is being placed on cost justification for public funds, and most likely it will result in changes of the studies now being conducted and the start of some new studies.

APPENDIX A

Studies Now Being Conducted by the Studies Department of the Controller's Office

1. Analysis of Academic Services and Direct Costs Each Term
(Salaries only)

Purpose: To determine: (1) unit cost of instruction and student credits by department, college, campus and university as a whole; (2) student - faculty ratio by department, college, campus and university as whole; (3) salary allocation to each type of activity; (4) equated full-time faculty by activity; and (5) an analysis of departmental research (percentage of assigned time, etc.).

Source: A form is completed for each faculty member, full- and part-time, including graduate assistants, which indicates what percentage of time is assigned to various activities. The Data Processing Service provides lists of courses being offered and salary information on the faculty members.

2. Graduate Assistant Study

Purpose: To prepare, by college, a detailed listing of all graduate assistants and related information such as period of appointment, salary per term and per year, number of credits scheduled during the current term, and any extra compensation paid during the current term. These data are summarized by college, providing number and average high and low salaries.

Source: Data Processing Service uses payroll data.

3. Annual Fellowship Study

Purpose: To prepare a detailed listing of all fellowships and such relevant information as the fund description from which they are paid, the amounts paid, the number of credits scheduled, and the amount and fund number of any extra compensation.

Source: Data Processing Service.

4. Sabbatical Leaves

Purpose: To prepare for each fiscal year a report showing the total number of people, average dollar amount and total dollar amount involved in sabbatical leaves by college. Total dollar amount paid is compared to total full-time academic payroll.

Source: Information is obtained from the "Application for Leave" form filed in the payroll department.

5. Graduate Study Leaves

Purpose: To prepare for each fiscal year a report showing the total number of people, average dollar amount and the total dollar amount involved in graduate study leaves, by college. Total dollar amount paid for graduate study leaves is also compared with full-time academic payroll.

Source: Same as for sabbatical leaves.

6. Space Utilization Report of Instructional Rooms

Purpose: To show the total number of classrooms, basic laboratories, and advanced laboratories used during a term, and the average

hours scheduled per room per week during the first six periods of the day and during nine periods of the day. The final average hours per week per room for classrooms and laboratories are used in comparison with other published data to show the percentile rank of Penn State compared to other institutions. Graphical charts are also make showing the average hours scheduled per week per room by room capacity, and several other graphs are presented showing various other breakdowns of the utilization of room capacity.

Source: Information for the report is obtained from cards received from the Scheduling Office.

7. Annual Academic and Non-Academic Salary Study

Purpose: To show a comparison of academic salaries; an analysis of academic personnel by rank, plan, college, etc.; and to determine a salary pattern for professorial ranks.

Source: Data Processing Service from payroll records.

8. Academic and Non-Academic Birth Date Study (included in academic salary study)

Purpose: To obtain the birth date information to present the number of academic personnel by rank and sex and the total for the various age groupings.

Source: Data Processing Service.

9. Employment Date Study

Purpose: To prepare listings and a report of the years of service for all full-time personnel by classification.

Source: Data Processing Service.

10. Credit Cost by Level of Instruction

Purpose: To prepare a cost per credit by level of instruction for each department and college for the term, shown by level, and by undergraduate and graduate classification.

Source: Faculty activity sheets submitted by all faculty members and the credit summaries used for the analysis of academic services and direct costs.

11. Degree Study

Purpose: To prepare a summary of the highest degree earned by the members of the faculty by rank and by college or major division.

Source: Faculty activity sheets.

12. Fall Count of Teaching Faculty

Purpose: To determine number of full-time and part-time teaching personnel by department and summarized by college and all-university classification.

Source: Cost-study code sheets that are prepared from faculty activity sheets and Data Processing Service listings.

# STUDIES IN PERSONNEL SERVICES AND EMPLOYEE RELATIONS

*Ray T. Fortunato*
Director, Personnel Services and Employee Relations

## SUMMARY

This department assists all levels of university administration in the development of personnel policies and practices, with studies being conducted to assist the president of the university, members of his staff, deans, and a number of special committees. Examples of these studies include comparative salary surveys, studies of disciplinary actions over several years, and job comparisons using as criteria the content of similar positions outside the university. Concern is expressed about the extent to which universities will be held accountable for their practices during the decade of the 1970s. Cost studies and other forms of research will be necessary adjuncts to administrative efforts directed toward achieving the greater efficiency now being demanded by the general public.

# STUDIES IN PERSONNEL SERVICES AND EMPLOYEE RELATIONS

The Department of Personnel Services-Employee Relations assists deans and other administrative officers, as well as persons at other levels of university administration, in the development of sound personnel policies and practices designed to improve the productivity and harmony of employees at all levels.

The staff consists of 35 administrative and clerical employees with the department being divided into five major divisions -- Employment, Salary Administration and Classification, Personnel Records, Employee Benefits, and Employee Relations. The department serves the needs of both faculty and staff at all campus locations, and its director serves on several continuing committees of the university including the Staff Committee on Academic Leaves and Promotions, the Staff Committee on Academic Salaries and Positions, the Staff Committee on Non-academic Salaries and Positions, and the Operations Committee.

The following classes indicate typical functions handled by the Department of Personnel Services-Employee Relations. First, it is responsible for a

wide range of activities that attend the process of recruitment, selection, hiring, and orientation of new non-academic employees. These include interviewing, testing, checking references, and providing other pertinent information. Salary administration and classification is a second major activity, with the department organized to conduct and participate in salary surveys, to classify positions under the Fair Labor Standards Act, to evaluate university positions, to write job descriptions, to conduct special studies on specific job titles, and to establish and administer salary policies. The department also maintains employee records that are essential to the studies it conducts, and to the policies and procedures that it administers.

A fourth area of direct concern involves employee benefits. Informing both employees and administrative officers about details of Penn State's benefit programs, coordinating the federal Social Security program, interpreting changes in laws regarding retirement and social security, and studying benefit programs are some activities conducted in this area. A variety of other activities also fall within the scope of the department's responsibilities including negotiating contracts with unions, interpreting policies, handling grievances, counseling employees, compiling data for research conducted by outside agencies and institutions, participating in organizational planning, and conducting studies on employee-related areas.

Eight studies are performed on a regular basis by the department including a survey of salary levels; reports on extra compensation paid to university employees; the compilation of information on "Affirmative Action Programs;" studies on discipline and dismissals; job comparisons; research on effective recruiting methods; surveys of job distribution; and research for conducting negotiations with labor unions.

The salary survey is performed each year, with the pay of several "benchmark" university clerical and technical service jobs compared to similar jobs in

the "marketplace" or areas from which such individuals are recruited. In order to insure accuracy of job comparisons, visits are made to other employers and job content is compared. The results of the surveys are used to recommend changes in salary schedules, and these studies have pointed up in the past where a particular job category has fallen behind in salary scale and corrective action needs to be taken.

Quarterly reports of extra compensation paid to university employees are assembled by the Controller's Office. These are then studied by the department and recommendations are made to administrative offices on how to accomplish the work less expensively through rescheduling or by changes in organizational makeup.

Information is also compiled annually on the effect of the university's "Affirmative Action Programs," which actively seek to promote employees from minority groups. A report is also made annually to the Federal government on this program.

Information on formal disciplinary actions and dismissals against clerical and technical service employees is compiled and distributed to administrative personnel to give them an opportunity to review the effect of activities in their areas of responsibility and to compare these to previous years and other university areas. A noticeable effect has been that administrators who had previously been reluctant to take corrective action have found positive examples in other areas to use as models for handling their own situations. This has lead to greater understanding among employees and their supervisors, more productivity and more effective work relationships.

Periodic studies are made by the department on the duties and requirements of specific positions, and these are compared with other jobs both within and outside of the university to determine the most effective use of personnel. A typical example would be the establishment of the "administrative assistant" position

in an academic department. Prior to the study, most department heads envisioned the job as a "super-clerical" one to which they could promote secretaries. As a result of the study, the character of the job has changed, so that it is now designed to relieve the department heads of administrative work, with persons of higher educational levels required to fill it.

The effects of various modes of recruiting used by the Employment Division of the department are regularly evaluated for such things as which types of procedures produce the most candidates? Are these good candidates? Which produce qualified persons really interested in employment with the university, and so on?

Annually, information is also compiled outlining the number of positions within each area of the university by grade and pay. For example, the number of clerical jobs in each college is compared with the number in similar colleges to see if any particular area is out of line with the others.

Prior to the negotiation of each contract with a union, research is conducted by the department into a number of areas. These include the sick leave usage factor; the hourly rate cost of the university's fringe benefits; an analysis of promotions made from within versus persons employed from outside the university; an analysis of how many employees are at each salary level within each salary grade; and a study of the length of service of employees. Also analyzed are the variety of shifts worked; the marital status and numbers of dependents and their status in the bargaining unit; the overtime worked; and red-circle rated employees, that is, those whose salaries exceed the normal limits for the level of their positions. In addition, surveys are made of salaries, working conditions, and benefits offered by other employers in the area.

The Employment Division of the department also makes a number of ad hoc studies, and these are

described in Appendix A. In summary, then, an important portion of the effort of the department's staff is devoted to making studies and to the dissemination of information as a guide to appropriate administrative officers.

## The Future

A forecast for the 1970s with which universities must live includes the prediction of a leveling off in the flow of funds. With this shortage of money, there will very probably be an emphasis on better management and greater accountability required. The challenge will be to make efficient and effective use of dollars in what many believe to be a relatively hostile climate of public opinion, since events of the past decade have caused a cooling of public enthusiasm for the support of higher education.

Other trends in the personnel area are predictable for the 1970s. Very possibly in this decade, a more complete unionization of employees of public agencies and nonprofit organizations will occur. In fact, a trend toward greater unionization appears well under way. Overtures have already been made toward clerical employees and faculty members in many institutions of higher education. Graduate assistants have organized at some universities. Collective bargaining has become an established fact at many community colleges.

Also ahead is the ruling that effective January 1, 1972, colleges and universities will come under unemployment legislation, and this will constitute one of many newly mandated inroads into the finances of higher education. Top university administrators will have to look to the expertise of their staffs to assist in meeting the demands of these and other new developments. More detailed cost studies will be needed on many aspects of the university's operation, both educational and supporting, since it appears certain that many future decisions will have to be made in an atmosphere of a weakening financial position.

Historically, institutions of higher education have seemed to enjoy the luxury of inefficiency. Even though great strides were made during the 1960s toward greater efficiency, universities are still believed by many to compare rather poorly with industrial organizations. The very arrangements that make a university effective in its own way -- internal looseness and autonomy of sub-parts -- seem to mitigate against attainment of an acceptable level of efficiency in times of severe dollar shortages.

Universities will need to expend greater effort in studying all aspects of their programs in order to face the inevitable questions about their need, cost, effectiveness and efficiency. It is no longer a question of whether accountability should be required, but rather, of how preparations should be made to find responsible answers to the questions asked.

APPENDIX A

Ad Hoc Studies Performed by the Department of Personnel Services-Employment Division

1. Salary Survey -- Ad hoc studies are made for specific positions such as those for physicians, dietitians, accountants, architects, programmers, and so on.

2. Fringe Benefits -- Studies are made on specifics as needed including rates being charged by Pennsylvania hospitals located near all university locations; amounts of life insurance other institutions provide for employees; and details of sabbatical leave provisions in effect at other institutions. Such studies have resulted in the adoption of improved employee benefits designed to fit this university's particular needs.

3. Age Studies -- These are made for organizational groupings as needed, for example, the deans, the president's staff, and the faculties.

4. Employee Attitudes -- Studies are made to determine employee attitudes. A specific example is the solicitation of opinions from all clerical employees on their preference for monthly versus bi-weekly pay.

5. Retirement Age Studies -- Comparisons are made of the ages of faculty and staff at time of retirement to determine the effect of provisions of an improved early retirement law on the retirements of faculty and staff.

6. Organizational Planning and Staff Needs -- Assistance is given to administrators in setting up organizations to best serve the conduct of their departments. Comparisons are made with similar type organizations at other institutions.

7. Turnover Studies -- Studies are made regarding turnover and the reasons for it. Statistics are evaluated by areas within the university to assist in lowering turnover rates.

# SPACE STUDIES AND JOB STANDARDS IN THE DEPARTMENT OF MANAGEMENT ENGINEERING

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SUMMARY

This department, which reports to the Office of the Vice-President for Business, is concerned with special studies to explore alternatives and suggest optimal courses of action on business-related questions. Studies are made of work measurement to establish standards for the allocation of space, and for specific organizational problems related to equipment and facilities. The department serves both non-academic and academic areas. Several space allocation studies and work measurement studies are discussed in more detail with attention given to the affects of recommended solutions.

# SPACE STUDIES AND JOB STANDARDS IN THE DEPARTMENT OF MANAGEMENT ENGINEERING

Before explaining two of the functions of the Department of Management Engineering at Penn State, namely space studies and job standards, it might be useful to briefly describe the department and its place in the organization.

A staff department, Management Engineering is responsible to the vice-president for business. Other departments also reporting to him include Maintenance and Operations, Physical Plant Planning and Construction, Purchasing, Housing and Food Services, Personnel Services, General Services, and Security.

The role of the Management Engineering Department is varied. It includes acting as a consultant making special studies for the vice-president for business in areas where unbiased fact-finding can develop the relative merits of alternative solutions to problems and suggest an optimal course of action. For example, should the university operate its own laundry? What steps need to be taken to improve the effectiveness of the operation of a particular service department? Is a facility

needed for off-campus storage of vital records? The department also serves as a fact-finding agency, making recommendations to established committees whose membership is made up of people rather far removed from the details of day-to-day operation. In this capacity, these recommendations become part of the routine culminating in committee action. Requests for increases in size of clerical work force, in the allocation of space and for alterations to space would come under this category. Work measurement studies are also conducted to determine improved methods and manpower needs in areas where the number of employees is great enough to warrant such detailed analysis, such as housekeeping personnel in the residence halls and janitorial personnel in academic buildings. The department additionally serves as a management advisor to any academic or non-academic department that may request help in matters of organization, layout of facilities, selection of equipment and office procedures. For example, advice could be given on the rental or purchase of special purpose delivery trucks, or a preventive maintenance program or central control plan for the Department of Maintenance and Operations.

As originally conceived, the department was to be concerned primarily with the departments reporting to the vice-president for business, and although this constitutes a major portion of Management Engineering's workload, it has also served other areas of the university, both academic and non-academic.

## Space Studies

Space planning, control and scheduling at Penn State is the responsibility of three agencies -- the Committee on University Planning and Development, the University Arrangements Committee, and the Scheduling Office.

The Committee on University Planning and Development determines what new buildings are to be constructed and the priority of construction, while the

University Arrangements Committee, a committee of vice presidents, is responsible for the assignment and use of university space. Management Engineering, serving in an advisory capacity to this committee, investigates requests and makes recommendations for committee action. This committee has a budget to finance moves and alterations.

The Scheduling Office, which reports to the vice-president for academic affairs, schedules all instructional facilities. These include general and special classrooms and auditoriums, instructional laboratories, studios, and similar facilities. The rooms scheduled by this office are specified by the University Arrangements Committee.

The Department of Management Engineering's work in the area of space studies can be divided into two functions: it serves as a clearinghouse for space, and it conducts special space studies. The clearinghouse function includes investigating requests for space or space changes, determining their justification, and recommending solutions. The department also maintains a record of future space needs or anticipated needs for space. It also maintains an inventory of presently available space (this is invariably zero) and space that will become available in the future. Largely the result of new construction that may release presently occupied space, future available space also comes from projects that are scheduled for completion and, as a result, will release space.

The special space studies function consists of analyzing data on space usage in problem areas, verifying the existence of a problem, determining the magnitude of the problem, and recommending a solution. The department also determines the number of years a college or department can be accommodated in its existing facilities, thereby providing a basis for planning new or expanded facilities for the department or college.

Although no single method or solution has been found to the special study problems, some examples of methods of solution are presented below.

Music Department

Due to the demolition of an existing building prior to the completion of a new building, it was necessary to reduce the number of music practice rooms. What was needed was an idea of the minimum number of practice rooms required, so a sampling study of their usage was conducted. Using part-time student employees, observations were made at random intervals over a period of several months.

Based on the study, it was determined that the number of rooms required was considerably less than that which would have been required if need had been solely based on enrollment and hours of practice per credit hour.

This case is a good illustration of how little "fact-finding" is done before some requests for space are made. The request initially was made on the assumption that anything less than what was currently available would be too little because there had been several student complaints about the lack of vacant practice rooms.

Analysis revealed that except for organ students, the opportunity to practice is not limited entirely to the number of practice rooms available in the music buildings, since some residence halls have music rooms that can be used. It was also discovered that practice rooms in certain locations received much heavier usage than others and that the time of day has a big effect on usage -- during the first period of classes a student could have a choice of nearly any practice room on campus.

## Office Space for College A

It was common knowledge that College A needed more office space. The problem was to determine what departments had the greatest need and how much space was needed immediately and in the future.

Data were obtained from the college on office space usage by departments including room numbers and personnel assigned by rank or classification. These were analyzed and ratios calculated on such factors as number of staff per office by classification and number of square feet by classification. This identified the departments with an immediate need for space (one had as little as 33 square feet per senior staff member) and the departments that had adequate or more than adequate space (the highest was 140 square feet per senior staff member). The data also provided a basis for selecting those departments that could be moved as units to other areas on campus, thus providing space for expansion of overcrowded departments.

## Office Space for College B

A similar study was undertaken to determine if a new office-classroom building for a college should be given high priority. As a result of the study, it was determined that the existing facilities would be adequate for at least six years if other unrelated occupants of the building were moved out. Plans were developed to accomplish this over a period of time to take care of the planned growth of the college.

## Job Standards

Few industries can survive today without standards for labor and a quantitative basis for decisions. Universities may not be able to go as far in this direction as industry. There are, however, certain aspects of university operations that are similar, in fact, almost identical to industry. It follows that universities can apply the techniques of industry to activities such as housekeeping work in residence halls, janitorial

work in campus buildings, planning and scheduling of maintenance work, equipment justification studies, and methods studies and standardization.

Two of the areas in which these techniques are being applied at Penn State are housekeeping in residence halls and janitorial work in academic buildings. Both are excellent areas for the use of industrial engineering techniques. The work is highly repetitive and large numbers of workers are involved-- more than 175 maids work in the residence halls and more than 200 janitors work in the academic buildings.

The first major effort was in housing not only because of the repetitive nature of the work and the large number of workers, but also for a number of other reasons. It was a rapidly expanding activity and the standardization of methods necessary for time standards would help insure uniformity of methods and cleaning frequencies throughout the residence halls. There had also been complaints of unequal work assignments from the maids. Since the university's housing areas were exceptionally clean, probably cleaner or as clean as the best in the country, the fact that this was achieved without detailed instructions and standards suggested that overcleaning was being done and savings could be realized.

Time studies were conducted and standard times determined for all repetitive housekeeping operations. Such data, then, allowed judgement to be made as to method and frequency -- keeping in mind both the quality of housekeeping desired and the cost. The end result has been formal instructions to each maid as to "when," "how," and "how often" each task is to be performed. These schedules aim at assigning eight hours worth of work daily to each employee.

In the case of janitorial work in academic buildings, a program similar to that for maids in housing was developed. Administrative computer facilities are used extensively with this program to assist

in developing work schedules and assignments because of the large amount and great variety of space covered (see references).

The use of time study is not necessarily limited to the development of time standards. It can also be a useful technique in other ways. For example, there was a request to investigate the need for an additional delivery truck and driver to serve a group of workers. Several eight-hour studies verified the claim that the driver had too much work. Analysis of the studies resulted in changes in methods that eliminated the need for an additional vehicle and driver. Eventually, the driver told his supervisor that he was no longer overworked.

Time studies are not the only technique used to secure useful information. Work sampling studies have been made of various workers. These studies have as an objective the determination of how the workers spend their time. The studies identify factors that reduce labor effectiveness and need improvement. Information of this type resulted in equipping a truck as a moving stockroom. This radio-equipped vehicle, stocked with a supply of frequently used items, reduced the number of trips tradesmen made from jobs to the central stockroom. This system was described in an article entitled, "Supplies on Wheels Keep the Craftsmen on the Job," which appeared in the October 1963 issue of *College and University Business*.

In conclusion, a few suggestions may be of value to those universities that may be considering the organization of a department similar to that of Management Engineering. First, if the department is to be concerned with space and other problems in academic areas, the staff of the department should include someone from an academic department. An individual with this background will be more acceptable to the academic sector and will also have a better appreciation of their problems. Second, if the department is to be responsible

for methods and standards work, the staff should include individuals with considerable industrial experience in this area.

Additionally, do not rush into work in the area of standards and methods and expect results quickly. Management engineering can produce results rapidly but these results require changes at all levels of the organization. Implementing changes too rapidly can create as many or more problems than are solved. And lastly, top management should demonstrate, at every opportunity, its support of the department. This should *not* take the form of directives or memorandums, but should be accomplished indirectly, and during the first few years, it should be done frequently.

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# THE ROLE OF THE OFFICE OF THE VICE-PRESIDENT FOR ACADEMIC AFFAIRS IN INSTITUTIONAL RESEARCH

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## SUMMARY

Institutional research is conducted in a wide variety of forms within the administrative organization for academic affairs. Special reports are made to the Board of Trustees, to the president, and to the University Senate. Other studies, usually with a narrower focus, are conducted by the University Division of Instructional Services (UDIS). Examples of UDIS projects include evaluation of experimental calendar arrangements, evaluation of an honors residence hall program, and evaluation of courses conducted in residence halls. The UDIS is nationally known for its extensive research in support of instructional activities. Much basic research on methods of instruction -- with an emphasis on films, television and other instructional media -- has been conducted over the last 20 years. A brief history of this program is included.

The Division of Academic Services is responsible for the admissions and records functions. It conducts a large number of routine studies, many of which generate information used in policy making by the University Senate, for example, and by external governmental and educational agencies.

# THE ROLE OF THE OFFICE OF THE VICE-PRESIDENT FOR ACADEMIC AFFAIRS IN INSTITUTIONAL RESEARCH

Institutional research is conducted within the Office of the Vice-President for Academic Affairs itself and within several offices directly under its supervision, such as Academic Services (admissions and records), the Scheduling Office, and the University Division of Instructional Services.

From time to time, the Board of Trustees requests information from the vice-president's office about the university's resident instruction program that may require a study, and the president of the university may request information that requires the compilation and analysis of appropriate data. Also, the University Senate may request an evaluation of some recently introduced instructional innovation.

Typically, when such studies are conducted, a small advisory committee is appointed by the vice-president for academic affairs to assist in planning the study. The actual gathering of data is supervised by one of the staff members in the office -- usually the assistant vice-president or one of the assistants to

the vice-president -- from material provided by the Records Office, the Senate Office, the Data Processing Service, the Controller's Office and other similar sources. If extensive data gathering or a survey is involved, the research staff of the University Division of Instructional Services is called upon to assist with the gathering, tabulation and analysis of the data.

Studies conducted by these methods are varied. One done in 1968 measured faculty and student reactions to two different types of academic calendars at the request of a subcommittee on calendar of the Senate Resident Instruction Committee. This survey was undertaken to obtain opinions on the instructional effectiveness of two different types of calendars -- one based on a 10-week module and one based on a 15-week module of classes. Questionnaires were sent to 28,442 students and 2,520 faculty members at all university locations.

Earlier in 1967, the University Senate had also requested an evaluation of a schedule in which the last two days of classes and the three days for final examinations were combined and 110-minute class periods were established so that comprehensive final examinations could be given. This study was designed not only to evaluate the use but also the acceptability of this type of arrangement.

To obtain student and faculty reactions to various aspects of a "satisfactory-unsatisfactory" (S-U) grading system, together with suggestions for improvement, an evaluation was obtained using student and faculty questionnaires. These were administered to a 10 percent random sample of the 4,135 undergraduate students who requested S-U grades for the Winter Term 1969; to a 10 percent random sample of faculty advisors in each college at the University Park campus; and at each Commonwealth campus where students had requested a course by S-U. Data obtained from the evaluation was organized in report form and presented to the committee charged by the University Senate with evaluating the S-U grading system.

Another study done in 1969 for the University Senate and also for the Board of Trustees involved providing information relating to the operation of experimental eight-week summer courses inaugurated in the Summer Term 1969. More specifically, the objective was to obtain student and faculty reactions to various aspects of the eight-week experimental program together with suggestions for improvement. Faculty and student questionnaires were designed specifically for this evaluation and approximately 5,000 of these were distributed to students and to instructors of 265 eight-week courses. The objective data were analyzed so that it was possible to look at the student responses from several different reference points. A summary of responses to subjective type questions was done for a 10 percent random sample of the completed student questionnaires, while responses to all questions on the Faculty Evaluation Questionnaire (objective and subjective) were tabulated and summarized.

The advisability of giving courses in residence halls also came under scrutiny during Fall Term 1969 when two courses, Speech 200 and English 3, were scheduled there and an evaluation was conducted to obtain student reactions. Designed to enable students to indicate what they felt to be the most and least satisfactory aspects of such a program and to make suggestions for improving the program, the evaluation questionnaire also provided data on the students who were currently enrolled in the program such as sex, major, term standing, and local address.

Another study involving residence halls obtained information concerning the Honors Residence Hall experiment. More specifically, the objective was to obtain student reactions to various aspects of the present program -- student-faculty interactions, interaction among students, living conditions, reactions to seminars and other organized activities. Students were also able to comment on what they considered to be the most and least satisfactory aspects of the Honors Residence Hall arrangement and were encouraged to offer

suggestions for improvement. Data for this evaluation were obtained via the Honors Residence Hall (Irvin) Evaulation Questionnaire, which was prepared in 1970 specifically for this purpose.

The desirability of scheduling a new pattern of instruction in elementary and intermediate German was also assessed to obtain student reactions to various aspects of the present program where classes are scheduled three times a week for 75-minute periods and to the proposed schedule of classes that would meet five times a week for 45-minute periods. The German Course Scheduling Questionnaire was administered to all students enrolled in German 1, 2, 3, and 4 during the Winter Term 1970. Objective responses were analyzed so that it would be possible to evaluate student responses from several different reference points.

## The Division of Academic Services

The Division of Academic Services is primarily concerned with data on enrollments and academic records, since the admissions and records function is its primary responsibility.

A large number of reports are generated within the division (see Appendix A), and while most are presently not published, they are nevertheless available to anyone who needs the information contained in them. (In past years, these reports were widely distributed, but the practice was discontinued for various reasons.)

Information collected by the Division of Academic Services is valuable to a variety of recipients. Internally, the University Senate is a frequent "client." In its legislative and advisory functions, the senate often needs information for reference in drawing up policies, guidelines and regulations. Consequently,

individual committees frequently consult with the division. The Committee on Curriculum and the Committee on Academic, Admission, and Athletic Standards are two examples of committees that often need specific kinds of information. The Graduate School's Committee on Courses in another example of an internal recipient of detailed information on enrollment. Further, much of the basic data for the efforts of the vice-president for planning originate within the division, and direct reports are made to the vice-president for academic affairs upon request.

The division also provides data for a variety of external agencies including the U. S. Office of Education, the National Association of State Universities and Land Grant Colleges, the National Center for Educational Statistics, and the American Council on Education. Although the Department of Public Information on campus is responsible for coordinating and filling requests for data from external agencies, it often forwards requests directly to the division.

Special projects also arise such as one for the Pennsylvania Higher Education Council, which recently needed a considerable amount of special information such as enrollment by classes and by classroom, and faculty teaching loads because it was in the process of creating institutional profiles based on space for students and efficient space use. The intent of the project was to establish a standard method of projecting feasible enrollment figures for individual colleges. Also, the so-called "Heald-Hobson Report" on Pennsylvania's higher education system was based in large measure on data provided through the division.

Staffed by 23 administrators and classified professionals on salaries, the Division of Academic Services also employs 57 full-time clerical position personnel and many part-time helpers during registration periods or on other ad hoc occasions.

## The University Division of Instructional Services

The main function of the University Division of Instructional Services (UDIS) is to support the instructional activities of the university. It is an outgrowth of a series of instructional research programs carried out at Penn State that date back to 1947, beginning with the Instructional Film Research Program, which was sponsored principally by the Office of Naval Research and extended over an eight-year period from 1947-1955.

This early program completed 65 published research reports and resulted in 14 Master's theses and 30 doctoral dissertations (Greenhill, 1956). Many of these studies were conducted using Penn State students as subjects and had a direct bearing on the use of films for teaching at the university level. Other studies were conducted using trainees at military bases.

In 1955, the Instructional Film Research Program was superceded by the Instructional Research Program, which ran for a period of four years with financial support from the Fund for the Advancement of Education, a subsidiary of the Ford Foundation. Studies during this period included the pioneer research studies of closed-circuit television for university teaching (Carpenter and Greenhill, 1955, 1958) and the "Pyramid Project", a study that involved the use of trained juniors and seniors working as discussion leaders with small groups of freshmen and sophomores in study-discussion sessions. These sessions were used either to supplement large lecture courses in sociology or European history, for example, or to assist majors in certain fields to integrate the various courses they were studying (Carpenter, 1958, 1959).

In 1958, a decision was reached to establish a Division of Academic Research and Services that would report to the Office of the Vice-President for Academic Affairs at the university. Key personnel from the

Instructional Research Program -- which had been based in the Department of Psychology -- formed the nucleus of the staff of this new division.

One function of the new division was to undertake continuing instructional research deemed to be of value for improving instruction at Penn State. Much of this research was conducted in cooperation with interested academic departments of the university.

The division was involved in investigating the educational effectiveness, acceptability, and feasibility of the Eidophor large-screen television projector for use in college level instruction (Greenhill, Rich, Carpenter, 1962). Another major project in this category involved the use of a combination of programed and televised instruction for teaching courses in Remedial English (English Usage) and Remedial Mathematics (Algebra). These courses had been offered in the conventional way for a number of years as English "0" and Mathematics "0". These non-credit courses were for students who were weak in either English Usage or Introductory College Mathematics. A major research report resulted from this study (Carpenter and Greenhill, 1963), and the algebra course was published by a commercial publishing house as a series of workbooks. About the time that this research was completed, the University Senate voted to abolish the two non-credit remedial courses!

The Division of Academic Research and Services also gathered data for the vice-president for development to use in compiling Penn State's long-range plans. This data related to population trends and trends in high school and college enrollments. In this sense, the division was engaged in institutional research.

Its services additionally included instructional television, film production, photographic services, and the beginnings of an examination service, from which developed a staff with competence in test construction to assist the faculty in the task of

assessing student performance in courses.

In 1961, a new university vice-president changed the scope and title of his office to Office of the Vice-President for Resident Instruction. The division also underwent a name change to University Division of Instructional Services (UDIS), along with a change of emphasis in its functions. Whereas the Division of Academic Research and Services had emphasized research as the major function with instructional services as a secondary role, the re-named division emphasized instructional services to the faculty as its main function with a lesser emphasis on instructional research per se.

At the present time, UDIS has six major sections: Instructional Television Services, Instructional Graphics Services, Still Photography Services, Motion Picture Production Services, Examination Services, Instructional Research and Course Development Services. These are available to faculty members at University Park and the other Commonwealth campuses.

The research efforts of UDIS are concentrated principally in Examination Services and that section of the division that is devoted to instructional research and course development.

Examination Services provides assistance to the faculty in test construction, test scoring (using Digitek Optical Scanners), item analysis, and research on test construction. A good deal of research has gone into the development of a course attitude questionnaire (Dick, 1965), which has been designed to secure students' evaluations of various aspects of instruction. The questionnaire can be tabulated on optical scanning equipment and computer programs have been developed for obtaining analysis of results using the university's IBM 360 Computer. The questionnaire was developed using factor analysis techniques and it yields six subscores relating to various aspects of a course: general attitude, method of instruction, course content, student interest and

attention, perception of an instructor and specific items. Considerable narrative data have been acculumated by extensive use of this questionnaire in the evaluation of courses both on the University Park campus and at other campuses of the university.

Because of the availability of optical scanning equipment and a staff that is experienced in the tabulation of data, Examination Services has assisted the University Senate and the Office of the Vice-President for Academic Affairs with several major studies. These include those dealing with faculty and student attitudes toward two different types of academic calendars and faculty attitudes toward a proposed faculty club.

An important aspect of the division's work is concerned with the evaluation of various innovations in instruction. These evaluations are performed by the research section of UDIS. Some of these studies are in the basic research category involving controlled experiments such as the effect of various types of visual material on learning (Dwyer, 1967a,b; 1968a,b,c; 1969e, f,g,h,i,j; 1970c,d,e). Others employ questionnaires to secure student or faculty reactions to a variety of instructional innovations. These include evaluation of student attitudes toward instructional television courses on Commonwealth campuses, and televised courses in residence halls (Dwyer, 1964).

UDIS also periodically undertakes a survey of the literature with reference to some significant aspect of university level instruction including a "Summary, Abstracts, and Bibliography of Studies of Class Size" (Division of Academic Research and Services, 1958) and "A Review of Characteristics and Relationships of Selected Criteria for Evaluating Teacher Effectiveness" (Dwyer, 1969d). Members of the staff of UDIS have also published numerous articles dealing with instructional research in professional journals.

In these ways, the Office of the Vice-President for Academic Affairs and agencies attached to it are involved in a variety of institutional research

studies, some of which may be more properly classified as instructional research.

APPENDIX A

Studies Conducted by the
Division of Academic Services

1. Drop List -- A straight alphabetical listing of all students, bachelor and associate, dropped from the university at the end of each term. (Unpublished).

2. Dean's List -- This listing includes campus location, name, number, sex, term, major, and term average for all bachelor and associate degree students (except Capitol campus students) who have attained a term average of 3.50 or higher.

3. Alphabetic List of Averages -- A straight alphabetical listing of all bachelor and associate students showing grade-point averages. (Unpublished).

4. Class Standing Lists -- This listing includes campus location, name, number, sex, term, major, plus term and cumulative average for all bachelor and associate degree students.

5. Class Ranks -- Class rankings are prepared for bachelor and associate students. (Published).

6. Scholastic Actions Summary -- This report is a summary of all scholastic actions -- Dean's List, drops and warnings. (Unpublished).

7. Degrees Granted -- Various tabulations, by type of degree, by year, and so on. (Unpublished); and a summary of degrees granted to former Commonwealth students. (Unpublished).

8. Student Directory -- Prepared by the Records Office each term except Fall. (Published).

9. Distribution of Enrollment -- (Published each term).

10. Geographic Distribution Report -- This report lists male-female enrollment by county for Pennsylvania residents, male-female enrollment by state or country of residence for non-Pennsylvania students. (Unpublished).

11. Marital Status Report -- A count of married students by sex and by term for undergraduates, graduates and adjuncts. Completed in the Fall term only. (Published).

12. Retention Study -- An analysis of the retention of students by various categories. Fall term only. (Published).

13. Continuing Education Enrollment Statistics -- Prepared semi-annually by the Records Office. It contains enrollment summaries and breakdowns.

14. Fraternity Ranks -- An alphabetical listing by fraternities and sororities showing the student's term and cumulative averages. Also includes summaries of all-university averages by class. (Unpublished).

15. Grade Distribution -- Prepared at the end of each Spring term. It contains tables that show grades received by students within each associate and baccalaureate degree major. (Unpublished).

16. Class List Summaries -- Low Enrollment -- (Unpublished).

17. Grade Reports -- Distributed to deans, departments, advisors, students, counselors, parents (mailer copy), Records Office and undesignated copy.

18. Commencement Program -- Records Office maintains a complete file. (Published).

19. Freshmen by High School -- Not published locally, but distributed to all Pennsylvania high schools. Lists all new freshmen who were admitted to Penn State for the Fall term of each year. It is sent to the high school principal.

20. Evan Pugh Awards -- (Unpublished).

21. Sparks Medal List -- (Unpublished).

22. Student Information Lists -- (Unpublished).

23. Satisfactory-Unsatisfactory Grade Summary -- By college major and course, prepared each term. (Unpublished).

24. Drop-Add Summary -- All locations, prepared each term. (Unpublished).

The Admissions Office conducts studies related to prediction of academic success at Penn State. It also prepares several other reports on a regular basis:

1. Admissions Progress Reports -- By college, by associate degree major, by location. (Unpublished).

2. Final Admission Report -- By total applications, by college, by associate degree major, by action taken, by location. (Unpublished).

3. Admissions Summary -- New freshmen by high school rank, by grade-point average, by Scholastic Aptitude Test, by male and female for University Park, combined Commonwealth campuses, and total all locations. (Unpublished).

4. Applicants by County of Residence -- By campus location, associate and bachelor degree. (Unpublished).

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# APPLIED RESEARCH IN CONTINUING EDUCATION -- THE DEPARTMENT OF PLANNING STUDIES

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SUMMARY

The Department of Planning Studies is charged with collecting information to support the decision-making process within the university's organization for continuing education administration and program development. The department is concerned with identifying the continuing education needs of selected professional groups, with assessing the effect of instructional aids on continuing education instruction and with assessing effectiveness and impact of current programs. It is unique in that no other educational institution is known to support an applied research unit in a division of Continuing Education* devoted to the collection of data for the purpose of designing innovative programs. A number of studies that have been made are discussed, and an outline of some important problems facing any research effort in continuing education is included.

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*Continuing Education is a "staff" agency of the university, which has no divisional or departmental description within its formal title. An artificial designation of "division" has been assigned to it in this manuscript, because it was felt that there might be some confusion between it and the general subject of continuing education.

# APPLIED RESEARCH IN CONTINUING EDUCATION--
# THE DEPARTMENT OF PLANNING STUDIES

The Department of Planning Studies is a part of the division of Continuing Education and is responsible to the university's director of continuing education. This unit is composed of four professional researchers with academic appointments in one of Penn State's existing colleges and a joint administrative appointment in the division of Continuing Education. The current professional members have academic rank in the College of Liberal Arts (Department of Psychology) and the College of Business Administration. These professional staff members are competent, by education and experience, to design and conduct research projects of a practical nature and to provide data for initiating continuing education activities. The professional staff is augmented by a technical writer, data processing personnel, secretarial assistance, and four graduate assistants.

The Department of Planning Studies continually conducts surveys to measure and determine developmental needs of adults. The nature and scope of these surveys vary from year to year. Only one activity -- an "In-

ventory of Continuing Education Activities in Institutions of Higher Learning and Secondary School Districts in Pennsylvania" -- is performed on an annual basis.

Information is also collected that will aid in the decision-making process affecting programs and administration of the university's total continuing education effort. The department's overall purpose is achieved through five objectives, the first being to design and conduct studies that will define and enumerate program needs of selected segments of the adult population of Pennsylvania. Additionally, it assists the academic departments in fulfilling their continuing education and public service obligations by delineating and measuring areas of need; it collects and provides demographic data that will be meaningful in helping the university meet its obligations to local communities; it provides, in written form, information about program needs that can be considered by those responsible to initiate and implement needed programs; and lastly, the department informs the various deans of continuing education -- one of whom is located in each college at the university -- of programs needed as dictated by the findings of each study.

Among the activities carried on by the Department of Planning Studies are investigations that identify continuing education needs of selected professional groups. The demand for increased competence and resourcefulness on the part of the professional and the need for a greater dissemination of new information makes is mandatory to identify topics that are important for updating and personal development. Studies of this nature provide a basis for enabling the division of Continuing Education to plan, initiate, and implement programs for specific professional groups.

Studies are also made to determine the best use of educational technologies, such as dial access (audio, video, computer, and hard copy), programmed learning, computer-assisted instruction, radio and television feedback systems, and similar technologies for

continuing education instruction. Follow-up studies are often conducted as validity checks for programs that are currently being offered. Such studies might be used to determine the changes in an occupational group, in geographical area needs, in educational media, and in other areas where a lapse of time may have changed the program demands.

To measure attitude or performance changes as a result of exposure to continuing education activities, evaluations are made of the effectiveness of a program as measured by changes in "on-the-job" performance, by changes in community action groups, or by changes in skilled performance. Studies are also made to gather evidence into the educational needs of people when mid-career changes are contemplated and after the decision on a career change has been made. Evidence now exists that such changes will be occurring more frequently, and many of these will involve the need for continuing education programs.

## A Direction for Institutional Self-Study

The role of the university is growing rapidly in relation to public service activities and possible opportunities to increase this role are presented within the department. For example, existing monies, such as those under Title *I* of the *Higher Education Act* could be used when the objectives of the funding agency and the Department of Planning Studies are compatible for studies that would benefit both the university and the community. A study might be undertaken, using Title *I* funds, that would attempt to delineate the problem of a specific community that could be met through continuing education activities. The Department of Planning Studies might also become the working survey arm of a college or department in a cooperative program, performing part of the data-gathering function that is essential before other units of the university could meet the local needs.

Already a program to assist industry, state governments, hospitals, educational organizations, and others has been instituted by the department to define the educational needs of these staffs or organizations as a first step in planning continuing education or personnel development programs. In this way, this program provides university expertise to private, non-profit, and governmental organizations, with the cost of each activity being borne by the organization requesting the service.

The department will also continue to undertake studies that will identify educational needs and topics important to the prevention of obsolescence by personnel in specific fields. This is particularly vital because of a rapid growth of available knowledge and a rising demand for increased individual competence and resourcefulness needed to deal with an increasingly complex and competitive environment. Studies such as these help to provide a basis for the university to plan, initiate and implement programs in continuing education.

## Problem Areas

The Department of Planning Studies is unique in that no other educational institution is known to have an applied research unit in the division of Continuing Education devoted to the collection of data that leads to innovative programs. A number of other institutions of higher learning have expressed interest in the Department of Planning Studies and are asking operational questions. In the meantime, Penn State is providing national leadership in conducting projects and fostering the philosophy of practical applied research to meet the needs of the adult population.

Still, the goals of the department have been hindered by the shortage of qualified people to conduct studies. The present national educational system prepares researchers to work in the fields of basic, theoretical, and educational research. Emphasis in the schools of education has been in the production of doc-

toral dissertations, and since no institution is training educational researchers for work in the applied educational field, it is necessary for such individuals to be developed on the job.

Just as there are no established procedures for training applied researchers, there are likewise, a complete lack of national or statewide continuing education norms, definitions, and criteria. Since the findings of the Department of Planning Studies are primarily designed to assist Penn State in planning innovative programs, the application of these findings is most often used internally. However, the internal use does not eliminate the problem since even within this university there is no common understanding of such terms as continuing education, non-credit programs, and non-degree programs. When off-campus sister institutions are considered, the lack of common norms and definitions becomes a major problem in coordinating and reporting educational information.

Applied research in the field of education, particularly continuing education, will have to produce a glossary of terms that are understood and accepted by this university's faculty, by statewide institutions of higher learning and, it is hoped, by national institutions and associations. This gap necessitates an abnormally long period of time to conduct studies since each term, procedure, and definition must be developed, tested, and then communicated.

The basic funding philosophy for the Department of Planning Studies is that it receives its basic support as part of the division of Continuing Education. Its personnel, therefore, are free to devote full-time activity to conducting studies without the wasted effort that occurs in year-to-year project funding. Non-university support, as noted elsewhere in this report, also is accepted and encouraged.

A particularly healthy sign of the acceptance, by outside organizations, of the work performed by the Department of Planning Studies is the willingness of these organizations to substantiate their requests for services with project dollars. In the past few years, support has been received from such diverse organizations as the American Hospital Association, National Cable Television Association, and Pennsylvania Department of Education, Sport Fishing Institute, Fish and Wild Life Service of the U. S. Department of Interior, and the U. S. Forest Service. This acceptance is further demonstrated by the fact that department personnel are serving on two national committees of the National University Extension Association in the area of educational surveys and research.

## Typical Studies

The following three studies illustrate the diverse nature of activities within the Department of Planning Studies. They range from the local study of the audience of Penn State's educational television station, to a statewide inventory of continuing education activities in institutions of higher learning, to a national study of educational needs in the cable television industry. Methods vary according to the research project, with printed questionnaires being most often used, alone or in combination with interviews. Financial support was obtained from the division of Continuing Education, contracts and grants from other organizations, and a combination of the two.

### Inventory of Continuing Education Activities in Pennsylvania Institutions of Higher Learning - 1969*

For the first time, a complete survey was made of the continuing education activities offered by

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*A similar study, "Inventory of Continuing Education Activities in Pennsylvania Secondary School Districts," was also conducted in 1969.

all types of institutions of higher learning in Pennsylvania. The survey was designed to secure data from private colleges and universities, junior colleges, community colleges, state-aided colleges and universities, state-related colleges, and state universities and colleges.

A four-page questionnaire was mailed to each of the 145 institutions of higher learning in Pennsylvania, whose registration numbers were presented in six program categories--associate degree credit; undergraduate credit; graduate credit; non-degree credit; non-credit; and conferences, workshops and seminars. Ninety-two percent (133 institutions) returned this survey, providing information on program categories, registration and subject content areas.

Individual educational institutions, governmental departments and educational organizations and agencies have already used the findings of the survey to provide improved continuing education offerings, eliminate program duplication, and to plan for future expansion. This study was made in cooperation with the Bureau of Vocational, Technical and Continuing Education of the Pennsylvania Department of Education, and the Pennsylvania Association for Adult Education.

Telephone Interview Audience Analysis of WPSX-TV -- Its Measurement and Evaluation - 1968; and Questionnaire Survey Audience Analysis of WPSX-TV -- Its Measurement and Evaluation - 1969

These two studies were conducted sequentially to provide information about the viewing audience of WPSX-TV, the Penn State educational television station. An analysis of the audience, their viewing habits, program evaluation, and possible program additions was desired as one means of providing quality educational television.

A random sample of telephone numbers was selected in 13 geographical areas within the broadcasting area, and 1,964 calls were completed. Forty-two percent

of the respondents said they viewed WPSX-TV. Questionnaires were mailed to the 1,648 respondents who agreed to complete them, and 820 questionnaires (covering 1,936 adults and 779 children) were returned. In the questionnaire phase of the study, 59 percent of the respondents said that they or somebody in their family watched the station.

Two separate reports were published since these data compiled from each study were different. Additional unpublished data providing localized information on each of the selected geographical areas were also supplied to the director of broadcasting. These have been used by WPSX-TV to provide general information to staff on the program interests of the audience, thereby aiding in the selection of programs for broadcasting, and to determine potential availability of various segments of the audience for various time periods -- aiding in decisions on what time to schedule certain types of programs.

Data on size of audience was also provided, along with a breakdown on the relative size of audience in various communities within the coverage area of WPSX-TV. This latter data brought with it the possibility of concentrating promotional efforts on increasing viewership in specific communities.

Educational Needs in the Cable Television Industry - 1970

This study was conducted to determine the educational needs of top managers, systems managers, and technicians in the cable television industry. The National Cable Television Association, Inc., of Washington, D. C., supported the research in cooperation with the National Cable Television Center for Education and Training.

For each of the three levels of job responsibility a questionnaire was developed and mailed to 224 member companies of the National Cable Television Association. Companies were classified as large (more than

50,000 subscribers), medium (15,000 to 50,000 subscribers) and small (less than 15,000 subscribers). One questionnaire for each job level was sent to the small companies, and proportionally greater numbers were provided for systems managers and technicians in the medium and large companies. Data provided by the study will be used by the National Cable Television Association as guidelines for developing continuing education activities for managers and technicians in industry.

Other Research Projects

The Department of Planning Studies has, to date, produced 94 reports resulting in numerous articles in journals, magazines and newspapers. These articles, together with the highlights (a four-page summary) are published after each completed study to disseminate the survey findings of each study. See Appendix A for a complete listing.

APPENDIX A

Research Projects Conducted by the Department of Planning Studies

1. Research Report of Continuing Professional Education for Engineers in Pennsylvania - 1965 (Completed); and Survey Report of Continuing Professional Education for Engineers in Pennsylvania - 1965 (Completed).

The data obtained in these studies were based on written questionnaires from 2,090 engineers in 171 companies in Pennsylvania. All of them had obtained their bachelor's degree in engineering five or more years prior to the study. Group interviews were held with a total of 408 engineers in 51 companies.

Fifty-three specific reports, which break down data from the engineering survey in various ways, have been published. These include 16 reports on industrial groups (primary metals, construction, etc.); 11 on geographical areas within Pennsylvania; 9 on engineering fields (chemical, civil, etc.); 6 on management areas (financial, sales, etc.); 4 on plant size; 3 on registered professional engineers; 2 on years in profession; and 1 each on state government engineering employees; and local non-credit courses in which engineers would enroll.

2. Determination and Measurement of Supervisory Training Needs of Hospital Personnel - A survey of Pennsylvania Hospitals -- 1965 (Completed).

Administrators and supervisory personnel in 213 of the 259 hospitals in Pennsylvania with 50 or more beds were asked to complete a questionnaire, yielding a total of 6,021 respondents. The survey included both general supervisory training needs and subjects pertaining to individual departments. Individual interviews with supervisors and group interviews with nurses were conducted in 50 hospitals.

Participating hospitals were informed of the educational needs of their own employees, as well as the responses from other hospitals of comparable size. Nine specific departmental reports have been published including:

Continuing Professional Educational Needs of:

H-54 - Hospital Administrators

A-55 - Nursing Service and Nursing Education

H-56 - Supervisory Personnel in the Dietary Department

H-57 - Supervisory Personnel in the Engineering and Maintenance Department

H-58 - Supervisory Personnel in the Business Office and Purchasing Department

H-59 - Supervisory Personnel in the Medical Records Department

H-60 - Supervisory Personnel in the Institutional Care Departments.

H-61 - Personnel Directors

H-62 - Supervisory Personnel in the Clinical and Radiology Laboratories.

3. Correspondence Instruction as an Educational Method in Hospitals - 1967 (Completed).

This study was sponsored by the Hospital Research and Educational Trust of the American Hospital Association with a grant from the W. K. Kellogg Foundation. A catalogue of 2,000 correspondence courses applicable to hospital personnel was developed. Questionnaires were sent to administrators and supervisors in 2,332 hospitals in the United States and 365 in Canada,

to explore attitudes toward correspondence courses and to discover employee educational needs that could be met through them.

Group interviews with supervisory personnel were held in 30 hospitals. Nine hospital-related correspondence courses were evaluated by former students and their supervisors, by dropouts, and by professional educators. Twenty-five experts commented on the value of correspondence instruction, and on the possibility of establishing a center for increasing hospital use of this *method of instruction*.

4. Managerial and Supervisory Educational Needs of Business and Industry in Pennsylvania - 1967 (Completed).

The full report and a condensation of it were based on questionnaire returns from 3,620 managers and supervisors in 250 companies in Pennsylvania: 705 top managers, 1,202 middle managers, and 1,713 first-line supervisors. Each group indicated their own educational needs; and in addition, top and middle managers noted the needs of those they supervise. Middle managers and first-line supervisors gave information on their educational background, methods they used to keep up-to-date, and company attitudes toward further education and training.

A condensation of the research findings -- "Survey Report of Managerial and Supervisory Educational Needs of Business and Industry in Pennsylvania" -- was published along with 19 specific reports by industrial category. These include:

Managerial and Supervisory Educational Needs in:

M-63 - Banks

M-64 - Chemical, Rubber, and Plastic Products

M-65 - Construction

M-66 - Department Stores

M-67 - Electrical Machinery

M-68 - Fabricated Metal Products

M-69 - Food and Kindred Products

M-70 - Insurance

M-71 - Machinery (except Electrical)

M-72 - Petroleum Refining

M-73 - Primary Metals

M-74 - Professional, Scientific, and Controlli
Instruments

M-75 - Railroads

M-76 - Stone, Clay, and Glass Products

M-77 - Telephone and Telegraph

M-78 - Transportation

M-79 - Transportation Equipment

M-80 - Utilities (Gas and Electric)

M-81 - Apparel, Textiles, and Leather

5. The Application of Linear Programming to a Lumber Inventory Problem in the Furniture Industry - 1967 (Completed).

This study demonstrated the specific application of linear programming to a lumber inventory problem as well as the fact that the application of continuing education learning has a direct effect on the operations as measured by reduced costs and increased profit

6. An Application of Linear Programming to a Minimum Cost Furnance Change Problem - 1967 (Completed).

The purpose of this study was two-fold -- to apply the linear programming technique to an actual company operation, and to point out indirect benefits that result when this quantitative tool is introduced into a foundry operation. A specific application was developed in which a minimum cost furnance charge was determined for particular kinds of steel.

7. Telephone Interview Audience Analysis of WPSX-TV -- Its Measurement and Evaluation - 1969* (Completed); and Questionnaire Survey Audience Analysis of WPSX-TV -- Its Measurement and Evaluation - 1969* (Completed).

These two studies report on the audience of WPSX-TV -- Penn State's educational television station. Telephone interviews were conducted with 1,964 respondents, and 820 questionnaires were returned.

Additional analytical data -- "Telephone Interview and Questionnaire Survey Audience Analysis of WPSX-TV - by 13 Geographical Areas," and "Audience Analysis of WPSX-TV in Jamestown and Olean, New York" - were not published but were transmitted to the director of broadcasting.

8. Educational Needs of Managers and Supervisors in Cities, Boroughs, and Townships in Pennsylvania - 1968 (Completed).

Data were collected by separate questionnaires from 138 managers in 28 cities, 48 boroughs, and 20 townships in Pennsylvania, and from 186 supervisors in 28 cities.

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*Additional information provided on pages 92-93.

9. A Training Program on Management Development for Health Agency Personnel - 1968 (Completed).

This report summarizes the results of a workshop held at The Pennsylvania State University under a Public Health Traineeship Grant from the Public Health Service, United States Department of Health, Education and Welfare. Data include program suggestions received from followup questionnaires submitted by the participants.

10. Measuring Attitudes Toward Management Development - 1968-69 (Completed).

This measuring instrument was developed to determine managerial attitudes toward management development programs. The attitude scale model developed differs from the more traditional attitude scales by yielding a more complete picture of the subject's attitudes. It accomplishes this by analyzing both the beliefs and the evaluation of these beliefs. The model also specifies how these beliefs and evaluations can be combined to yield a quantitative measure of attitude. With this method, it is also possible to specify the positive and negative elements in an individual's or group's attitudes by operationally teasing out the strength of the subject's beliefs from the evaluative aspect of these beliefs. As such, it provides a basis from which attitude changes can be initiated.

11. Inventory of Continuing Education Activities in Pennsylvania Institutions of Higher Learning - 1969* (Completed); and Inventory of Continuing Education Activities in Pennsylvania Secondary School Districts - 1969 (Completed).

These studies for the first time provide a complete record of continuing education activities in Pennsylvania. Questionnaires were returned by 133 of

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*Additional information provided on pages 91-92.

the 145 institutions of higher learning in Pennsylvania, and 89 of these reported that they had conducted continuing education programs for adults during the preceding years. Questionnaires were also returned by 449 of the 592 secondary school districts, and 285 of these reported continuing education programs for adults. The number of registrations is given in both studies.

12. A Systems Approach to Updating Professional Personnel - 1969 (In Process).

Technologies have accelerated and advanced so rapidly that demands for the dissemination of newly developed knowledge and increased competence in professional fields has become increasingly important. The objective of this study is to describe the updating process from mathematical and psychological viewpoints.

13. Educational Needs in the Cable Television Industry - 1970* (Completed).

An investigation of the professional educational needs of 67 top managers, 131 systems managers, and 194 technicians in the cable television industry.

14. Continuing Professional Education Needs of Natural Resource Managers - 1970 (In Process).

The purpose of the study is to determine the current and long-range updating needs as perceived by managers, scientists, and technical personnel employed in the various fields of natural resource management throughout the United States.

This study is being conducted in cooperation with Penn State's School of Forest Resources and is under the sponsorship of the Sports Fishing Institute, the Fish and Wildlife Service of the U. S. Department of the Interior, and the U. S. Forest Service.

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* Additional information provided on pages 93-94.

15. Use of Statistical Sampling Techniques by Accountants - 1970 (Pending).

This project, in the developmental stage, is aimed at determining the use of statistical sampling techniques by accountants in inventory-taking during the auditing of financial statements of a corporation, and the extent of continuing education courses in sampling needed by accountants.

Age, educational experience, training in statistical sampling, and experience in taking physical inventories will be considered.

A second portion of the study will consider the degree of proficiency possessed by the person and the degree of proficiency he should possess.

16. A Hospital Patient Care Flow Model to Stochastic Structure - 1970 (Pending).

The purpose of this project is to construct a flow model of stochastic structure, based on a multilevel classification of hospital patient care. The model will be used to estimate the expected number of patients at each care level and location at any period of time based on the patient's arrival date over time. This information will provide a necessary basis for determining optimal staff loading.

17. Measuring Obsolescence in the Nursing Profession -- A Mathematical Model - 1970 (Pending).

The problem of obsolescence has become increasingly important because knowledge is growing at an exponential rate, techniques are changing rapidly and a lag exists between the development of new knowledge and its utilization in operational programs.

The specific aim of this contemplated project is to construct a mathematical model for describing occupational obsolescence. Nursing has been selected

as the occupation to be investigated in cooperation with Penn State's College of Engineering and the director of nursing in its College of Human Development.

18. Inventory of Continuing Education Activities in Pennsylvania Institutions of Higher Learning - 1970 (Completed).

A second inventory (see page 91) of continuing education activities offered by institutions of higher learning in Pennsylvania was completed in the spring of 1970. As in the previous inventory, the survey was designed to secure data from private colleges and universities, junior colleges, community colleges, state-aided colleges and universities, state-related colleges, and state universities and colleges. The number of registrations is presented by six categories: associate degree credit, undergraduate credit, graduate credit, non-degree credit, non-credit, and conferences, workshops, and seminars.

A four-page questionnaire was mailed to each of the 146 institutions of higher learning in Pennsylvania and a 100 percent return was received. The complete participation by *every* institution of higher learning in Pennsylvania in this second inventory testifies to the acceptance of the data by these sister institutions. As was true of the first inventory, the findings of the study are being used by individual educational institutions, governmental agencies, committees and educational organizations to expand the continuing education offerings within the Commonwealth of Pennsylvania. It should be pointed out that the number of institutions offering continuing education activities increased from 89 institutions (67%) in 1969 to 115 institutions (79%) in 1970.

The survey was funded by the Bureau of Vocational, Technical and Continuing Education of The Pennsylvania Department of Education in cooperation with the Pennsylvania Association of Adult Education.

19. Inventory of Continuing Education Activities in Pennsylvania Secondary School Districts - 1970 (Completed).

This study was the second inventory (see page 100) of continuing education activities conducted by secondary school districts in Pennsylvania. Questionnaires were received from 592 school districts (99.2%) and the data reported by the following 11 areas: Agriculture Education, Adult Basic Education, Business Education, Civil Defense Education, Distributive Education, General Extension Non-Credit, Health Occupations, Home Economics, Manpower Retraining, Standard Evening High School, and Technical and Industrial Education.

Three hundred and fifty-three school districts (59.6%) reported conducting continuing education activities during the academic year July 1, 1968 to June 30, 1969, which is an increase of 68 school districts over the previous year.

Copies of all reports resulting from studies conducted by the Department of Planning Studies may be secured from the Continuing Education Business Office, J. Orvis Keller Building, University Park, Pennsylvania 16802.

# THE RESEARCH AND SERVICES PROGRAM OF THE OFFICE OF STUDENT AFFAIRS RESEARCH

*Edmond Marks*
Director, Student Affairs Research

SUMMARY

This office serves the organization under the vice-president for student affairs. Its principal focus is the study of the impact of the college experience upon students, and four categories of activities characterize its operation-- data processing, systems research and services, specific research and consultation, and long-range programmatic research. The activities of each of these areas are outlined. Examples of studies conducted include an in-depth operations analysis of the financial aid function, an extensive study of Penn State's educational goals and characteristics as viewed by the various segments of the university, and an attempt to develop a model for career choice and adjustment during the college year. Several studies and their theoretical backgrounds are discussed.

# THE RESEARCH AND SERVICES PROGRAM OF THE OFFICE OF STUDENT AFFAIRS RESEARCH

Historically, the Office of Student Affairs Research (SAR) had its beginning in 1955, when it was established to assist the dean of admissions and registrar, and the then recently established Division of Counseling with their data systems and research needs. Increased demands upon the services of both these units required, at that time, the development of a sophisticated data collection, storage, and retrieval system. Equally important were the research needs of these units where, for example, the admissions office sought constantly to improve its selection of talented high school students through the search for more powerful predictor variables and models, and the Division of Counseling attempted to build and evaluate better and more relevant counseling measures and techniques. Thus, the early efforts of SAR were mostly concerned with test construction, validation and norming, methods of predicting academic performance, and the development of high-speed machine techniques for storing and reporting data.

As the number of staff grew in response to these increasing demands, the structure of SAR became

more highly differentiated. An operations section was established to administer what had become the massive pre-registration testing program of the Division of Counseling, while a research section assumed responsibility for test construction, research on academic performance, the examination of counseling effectiveness, and surveys of student characteristics and opinions. It was during this period that many of the current placement tests used at Penn State in English, mathematics, and chemistry, for example, were first constructed and then continuously modified. It was also during this period that SAR developed and administered for the Pennsylvania Department of Public Instruction its State Scholarship Examination Program. Concurrently, the research section of SAR examined a number of motivational and aptitude variables that were thought to show -- in addition to the traditional scholastic ability and high school performance measures -- promise in predicting academic achievement and retention. Like the too-often-encountered outcomes of such studies, the results of these particular efforts were bounded by the asymptotic barrier where only some 50 percent of the variability in grades could be accounted for by the predictor measures employed, regardless of the number or type of predictors included. A similar fate befell attempts to examine more complex prediction models, for example regression models, which were nonlinear both in their parameters and their variables. It was concluded that the increases in predictability of academic achievement -- and thus the reliability in selecting students for admission -- yielded by the addition of new predictors or the use of more complex prediction models was simply not justified by the large costs associated with their use, at least until a more rigorous examination of the criterion itself, that is, grades, could be undertaken.

Considerable strides were also being made in the data and operations systems areas, strides that were greatly facilitated by the increasing involvement of the Penn State Data Processing Service. In terms of the data system, for example, a comprehensive student file was developed containing such information as high school

performance, measured scholastic ability, scores on a variety of achievement tests, selected biographical and demographical characteristics, and interests. These data and the ability to report them in a desirable format within a reasonable time enhanced the effectiveness with which the divisions and instructional units could deal with student problems and concerns. Placement decisions regarding the appropriate level at which a given student should begin his learning sequence can serve as an example. This file also served as the basis for SAR research projects such as the study of student attrition or change of major and the antecedents of such behavior. Operationally, a rather complex but smoothly functioning procedure for scheduling pre-registration testing and counseling was continually modified to yield increased efficiency.

In terms of the current posture of SAR relating to its research and services, there were three factors that influenced or shaped the program of SAR as it is now conceptualized and expressed. First, the increased effectiveness of the operational and data systems resulted in less staff time being required for major developments and revisions in these systems. Aside from that needed for normal maintenance, considerable staff time could now be devoted to other activities. Second, a similar phenomenon was occurring with respect to test development where the number of new tests to be constructed decreased markedly. Staff efforts in this area were limited to test updating and monitoring. Finally, and most important, there was a growing awareness among the staff that the research efforts of SAR should be broadened substantially to encompass the long-term, programmatic study of certain crucial and extensive research problems in higher education. These factors had a profound effect upon the direction which SAR was to take.

In terms of its prevailing program and its role as an institutional research instrument, SAR has established as its principal goal the study of the impact that the college experience -- both academic and non-academic -- has upon most, if not all, aspects of

student life and functioning. Because of both staff time and facility constraints, and the generality of this goal, it is apparent that some selectivity and specificity must be exercised in determining what segments of the goal should and can be realized. One major segment that can reasonably be excluded is that of instruction, that is, the study of those principles and methods relating to the acquisition, retention, and utilization of academic content. This exclusion is justified in that the University Park campus of Penn State already possesses a substantial body of expertise focusing upon teaching problems -- for example, the effects of mode instruction and content parameters on learning, teacher and student characteristics related to learning, and educational technology.

By excluding research on the instructional process, the efforts of SAR have been delimited to include the study of those changes in selected properties or characteristics of the student and his behavior that are due to the college experience other than what is formal teaching. While this represents an acceptable overall objective or direction for its efforts, the services and research endeavors of SAR can be more precisely formulated and structured in terms of four interrelated categories of activities -- data processing, systems research and services, specific research and consultation, and long-range programmatic research.

## Data Processing

In addition to SAR, there are nine other divisions that report to the vice-president for student affairs. All of these deal directly with the student population such as the Dean of Students, Student Aid, and the Health Service. In most cases, such encounters require that certain relevant information on the student be collected -- for example, a medical history -- and an updated student record be kept -- perhaps a record of visits to the Health Service. While there is some slight overlap in the data needs of these various divisions, the services provided by them are so clearly differentiated that they require, for the most part,

unique sets of information. This first function of SAR is, then, to develop and provide the most comprehensive and readily accessible data base upon which the divisions within the Office of Student Affairs can draw for their student services. Quite obviously, SAR has turned to the computer to meet this need. The core of this information base is contained in the Student Master Research Tape, which is a student file developed and maintained by SAR in conjunction with the Data Processing Service (DPS). To meet all of its data needs, SAR also draws from other files maintained by DPS.

The reporting of data takes a variety of forms depending upon the uses to which the data are put by the requesting division. Most frequently, data reporting takes the form of printed output listings where the students have been classified or cross-classified on a number of variables. Punched cards and mailing labels have also been found useful by many of the student affairs divisions. At times, rather than needing individual raw data, a given division could more appropriately use summary statistics from these data. In such cases, means, standard deviations, frequencies, percentages, and other descriptive statistics are computed depending upon the nature of the problem.

## Systems Research and Services

Having access to a comprehensive data pool is only half the battle in establishing a smoothly functioning program for any student affairs division. The more crucial aspect of operational efficiency centers on the manner in which management decisions are structured and taken. Mere information is useless unless it is properly integrated into a well-oiled system of procedures and decision strategies. Recognizing this need, SAR has on its staff a systems analyst whose responsibility is to examine the program objectives of the individual student affairs divisions, and then recommend, within the existing constraints, a set of procedures and strategies tailored to meet these objectives. The systems approach is particularly useful for several of the di-

visions because of the massive and routine information and decision functions to be handled, such as recruiter scheduling in the Placement Office and aid applicant screening in the Student Aid Office. Probably, the most important outcome of the systems approach to divisional operation is the fact that by capitalizing on the high speed and reliability of the electronic computer for routine decision functions, increased staff time is made available for handling more complex and subjective decisions.

An area where the systems approach has proven to be particularly helpful is student aid, where an in-depth operations analysis (as described in Student Affairs Research Report 70-11) of the student financial aid function provides a well-developed rationale and set of procedures for this service.

## Specific Research and Consultation

SAR must be and has been responsive to those research notions, hypotheses, and programs relating to student behavior and the college environment that are initiated by members of the university community other than SAR. In particular, SAR encourages staff of the other student affairs divisions to express and submit their research ideas and innovations. Frequently, these concerns take the form of loosely formulated research questions that faculty and staff have relating to specific problem areas. The treatment of the disadvantaged or minority student, or the evaluation of the effects of certain university housing programs on the personal development of the student would come under this category. The range of involvement by the SAR staff varies from complete treatment of a problem, that is, formulation of the study to writing of a report, to consultation on a specific aspect of a problem such as data collection and processing, or advice on statistical analysis. In some cases, the contribution of SAR may be limited to consultation on master's and doctoral theses. Where appropriate and of benefit to the university, collaboration and consultation may extend to institutions, agencies,

and persons outside of Penn State, such as test construction and norming for the Pennsylvania Department of Education.

An important example of such collaborative research efforts is an extensive study of Penn State's educational goals and characteristics as viewed by the various segments of the Penn State community, which is under the direction of a SAR staff member. This study, known as the "Penn State Self Study," is being conducted for the University Senate Committee on Academic Development with the Center for the Study of Higher Education providing financial support. Its purpose is to examine the perceived role and character of Penn State as an insititution of higher learning, and how these properties should be changed or modified.

Studies of limited scope also originate with SAR. An example of such research is a series of studies conducted by SAR examining the academic achievement and attrition over four years of "native" students, that is, students who matriculate at the University Park campus, and "transfer" students, those who matriculate at one of the Commonwealth campuses. This type of study is usually directed at answering a rather specific research question, although at times these can be integrated into a more broadly conceptualized or theoretical development. In general, however, research under this rubric is rather narrowly conceived, focusing on research problems and program evaluations that are of immediate concern to one or another operational units or individuals.

## Long-Range Programmatic Research

A more recent concern and involvement of SAR is the in-depth and systematic investigation of certain crucial and extensive substantive research problems in higher education. Examples include the impact of differential college environments on the personality and attitudinal development of the student during the college years, the study of factors influencing career choice and adjustment, and the formation, structure,

and dynamics of student social organizations and subcultures. These efforts are to be distinguished from the research activities described in the previous section, which are mostly ad hoc and directed at specific and circumscribed problem areas.

The following comments offer a framework of research in higher education that is guided by the overall objective enunciated earlier -- the study of how the college environment and college experiences affect or shape properties of the students and student behavior. All educators agree that the class of college experiences or factors should have an effect upon student variables, including scholarship, the domain of student personality, attitudinal, and value-goal systems, and student personal and inter-personal behaviors. The role of the researcher in higher education is to systematically examine the relationships between these experiential and personal variables, and to develop models or theoretical structures that tie the two sets together in an inclusive system.

Most serious research in higher education such as that done by the American Council on Education, the National Merit Corporation, the Educational Testing Service, and the American College Testing Program, is based on a simple input-output model represented by the matrix equation:

[STUDENT INPUT] · [COLLEGE FACTORS] = [STUDENT OUTPUT].

This is used here for heuristic purposes only.

In most cases, the matrix of student input is given or fixed by admissions strategies that are, in turn, usually based solely on academic potential. Thus, the institution has little control over the distribution of non-academic talent. The matrix of student input, however, defines what the institution "has to work with," and, as such, serves as the basis for studying college impact and student change.

The student input matrix can be broken down into six major classes of variables that should -- at least theoretically -- be considered and assessed.

1) Talents. These are rather specific abilities, aptitudes, and achievements, determined by both genetic and experiential factors that the student brings to college. Five sets come to mind including scholastically related, artistic, physical, handiwork, and organizational talents. For any given student these will typically be differentially developed, so that while he may paint extremely well, his math skills are poor.

2) Personality-social factors including interests and attitudes. These include a wide variety of behavioral preferences and behaviors of the student relating him to people (interpersonal strategies like aggressiveness and Machiavellianism), objects(aesthetic preferences), ideas (religion and national defense), and situations (risktaking and impulsivity).

3) Cognitions. These include student judgments about self and the environment. They also involve subjective probability estimates of environmental states and the student's relation to such states.

4) Learning and Reinforcement Experiences. These include a wide variety of family, school, church, parental, and significant-other-person experiences that shape a student's behavior and thinking.

5) Aspirations and Goals. This class includes those environmental and personal outcomes, including good pay, status, and well-being, that are valued by the student.

6) Ecological Factors. These include a wide variety of what are commonly called biographical or demographical variables.

A variety of research efforts could be undertaken -- as is frequently done -- on this matrix of student input. These might take the form of "ecological

studies," for example, describing or profiling the incoming student population; "structure studies," involving factor analysis of input data in an effort to uncover a simplified and meaningful structure; "cultural studies," which examine mean or other differences among various student subgroups; and "prediction studies," which forecast certain performance or behavioral outcomes from input variables. These studies, however, do not adequately meet the overall objective, for a crucial component is missing, that of the matrix of college factors such as the college environment and the experiences it provides.

The matrix of college factors has been a singularly nasty problem for research workers in higher education. The most immediate problems are the definition and measurement of college environmental variables; there being considerable disagreement on what is an environmental stimulus and even more disagreement as to how to measure it.

The following grouping of college environmental variables, while crude, offers a first approximation to the definition of the matrix of college factors.

1) Physical Environment. This class of environmental stimuli consists of most properties or attributes of the college environment into which the student has been thrust, including both people and programs as well as its physical properties. Some of the elements of this class are: physical plant including such things as classroom, dormitory, and library and research facilities, and recreational buildings; surrounding community including type of community (for example, urban industrial, urban ghetto, or rural), and type of people (educational and occupational level, and attitudes); administration such as quality, attitudes, personnel services and programs, and organizations; faculty, including quality, teaching skills, research activities, and attitudes; students, which are described mostly in terms of the student input matrix; staff; and comfort, which relates to the pleasingness or utility

of the physical environment to the student.

2) Social Environment. This is a more abstruse class of environmental and experiential variables involving how the student relates to other persons, and formal and informal organizations. Informal friendships, contacts with the opposite sex, athletic or other recreational pursuits, and memberships in formal or informal organizations are only a few of such stimulus configurations.

3) Information Nets. This loosely conceptualized class of college factors concerns the type and flow of information or communication within the institution. It includes the generation and transmission of ideas and information such as the concepts and communications of a student radical groups; the relation of student input variables to student receptivity of such ideas and information; the communication of behavioral prescriptions and proscriptions from the administration and faculty to the students; and factors defining how a student is to behave both formally and informally. This class of variables, then, deals with information nets -- their establishment and structure -- and the formation of prescriptions of student behavior.

Returning to the simplified matrix question -- which is not a true matrix question at all -- the objective of SAR's programmatic research efforts is defined as the study of how the specific elements of the matrix of college factors operate on or interact with the elements of the student input matrix to yield, what is labeled here as the student output matrix. This is clearly a dynamic model based on the notion that the college environment shapes or changes student behavior, feelings, and attitudes.

Two current SAR research projects can be briefly described that illustrate this programmatic research objective. The first deals with a model for student career choice and adjustment. Assuming that students matriculate at the university with either partial or complete closure with respect to career objectives, it is possible to model the flow of these

students over a four-or five-year period through various sectors of the university where each sector represents a different career outcome. In turn, each characteristic flow pattern can be related to selected student input variables and changes that occur in these variables over time in an effort to uncover the antecedents or dynamics of career adjustment. The objective of this research effort is to develop a theoretical statement or at least a model for career choices and adjustment during the college years that can be used in the counseling of students regarding their career goals and choices.

The second illustrative case involves a research area whose focus of concern is particularly salient for students at a resident college. The construct under study has received increasing attention especially from psychologists who have labelled it "power," by which they mean the desire and ability of an individual to cause environmental change so as to obtain an intended effect. All humans -- but certainly resident college students who must adjust to a radically new and complex environment -- attempt or at least desire to bring about in their ongoing transactions with their physical and social environments certain outcomes that are pleasing or acceptable to them. To effect satisfying friendships, to influence others in social interactions, to obtain good grades and achieve career objectives by skillful performance, and, in general, to be master of one's destiny rather than the pawn of external forces, are examples of personal "power," for today's college students. SAR has begun an extensive program of research on the structure and dynamic of individual needs, feelings, perceptions, and strategies relating to "power" and how these are manifested in observed "power" behaviors. Studies already under way are examining student perceptions of the dimensions and structure of power in the university and the sources from which such power is derived. As with the career development area, it is hoped that these efforts will lead to a theoretical statement relating to the college adjustment process

that will permit the development of university programs
maximizing for the student the efficiency of this proces

# INSTITUTIONAL SELF-STUDIES AND THE CENTER FOR THE STUDY OF HIGHER EDUCATION

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## SUMMARY

The Center for the Study of Higher Education has been in operation for one year at this writing. One of its prime functions is to foster a professional self-consciousness within the university and among institutions of higher education with regard to opportunities, the consequences of decisions, and the availability of alternatives. It seeks to foster introspection and debate on the part of faculty members and administrators both at this university and beyond. Some areas of study at the present time include the governance of higher education including a study of the University Senate and one on special purpose institutes, the extent of programs for human service occupations in two-year colleges, and a survey of the application of systems analysis to higher education.

# INSTITUTIONAL SELF-STUDIES AND THE CENTER FOR THE STUDY OF HIGHER EDUCATION

The Center for the Study of Higher Education at Penn State was authorized by the Board of Trustees in January 1969, and the director assumed his responsibilities on April 1, 1969. An initial staff was assembled and operations began during the late summer and early fall of 1969.

The center aims to subject higher education as a social institution and as a process to the searching scrutiny of the scholar and researcher. Nationally, such study has led to the development of wiser social policy for higher education at the institutional, state and national levels. It has resulted in increased attention to the varied manpower needs of states, regions and the nation to be met by undergraduate, professional and graduate schools. Such study has contributed to the capacity of American higher education to respond to increasing numbers of students of diverse talents, aptitudes and needs who seek a college education. It has also nurtured a growing self-consciousness within and among institutions of higher learning.

The Pennsylvania State University and the Commonwealth of Pennsylvania have not been unmindful of these developments. For a number of years, the university has offered programs through the graduate school that prepared young men and women for teaching, administrative and research careers in higher education. Its research on the use of instructional television has been outstanding. Penn State's long history of studies in college student personnel administration and its comprehensive programs in this field have been recognized nationally. Manpower training and related studies that have been conducted by Penn State's division of Continuing Education are among the best. Other areas of research and development into processes of higher education at Penn State could be cited to show that this university has been among the nation's leaders in this area of activity.

The university, as it established the center, proposed to expand, complement, and consolidate its programs of research, education, and service in higher education per se. Actually, the center sees itself with a five-fold mission. First, it gives serious attention to the study of internal educational operations at Penn State itself. The center has a modest component devoted to institutional research, with studies emanating from this section that are designed to complement studies being made elsewhere in the university. Findings are made available to various offices and committees within the university for policy making and for long-range planning.

Secondly, the center, in harmony with the university's Land Grant tradition, has initiated studies that will enhance the public and private higher education programs of the Commonwealth of Pennsylvania. It has begun to establish relationships with other colleges and universities, looking toward programs of inter-institutional cooperation and mutual service. Seeking not to dominate but to facilitate joint programs, it expects to engage in research and developmental activities and to disseminate findings in useful workshops and conferences.

The center has also attempted to work cooperatively with Pennsylvania's State Department of Education on matters of mutual concern in higher education. It seeks to be a resource to the department and to enhance planning and assessment activities for the Commonwealth as a whole.

With supplementary external financial support, the center plans to conduct studies of long-range state and national significance directed to such topics as the problems of organization and administration in complex universities; issues of governance and decision making; prediction and assessment of long-range manpower needs in selected fields; the emerging significance of the fine arts and the humanities in the curriculum; processes of institutional adaptation; and the role of universities in relation to the problems of the cities. In addition, the center attempts to play a significant role in support of the university's graduate program in higher education leading to the doctoral degree. Courses in higher education are offered by staff members, who also assist in the direction of research of doctoral students.

In summary, what should be the fundamental role of the center in the university structure? Martin Meyerson once suggested that the role of such a center was "to make the higher education community educationally self conscious." This phrase seems apt. The center does not merely attempt to provide information relevant to decision making in higher education. Neither does it aim only to be a significant formulator of potential higher education policy. But through research and scholarship, it strives to awaken consciousness to opportunities, enhance sensitivity to the consequences of decisions, suggest alternatives, and foster introspection and debate on the part of faculty members and administrators, both at this university and beyond.

## Organization of the Center

The director of the center reports directly to the vice-president for academic affairs. The center also maintains close relationships with the Graduate School and the College of Education and since work of the center is university-wide, it has established firm, cooperative relationships with the several divisions of the university that have complementary research or related programs.

The 1970-71 staff numbers 15, including 4 secretarial-stenographic persons and 6 graduate students serving as part-time research assistants. Four of the center's professional staff also hold professorial appointments in the Department of Education Policy Studies, in which they assist with the university's graduate program in higher education. In 1969-70, a member of the professional staff served half time as a systems analyst in the Office of the Vice-President for Student Affairs. University faculty members in other departments also assist in the center's research program, along with a limited number of doctoral students in the graduate program in higher education.

Dissemination of findings is an important function of the center, and reports of its scholarship are issued as appropriate. Plans are also underway to publish a monograph series and to conduct conferences of interest to scholars and practitioners in the field. The first such conference was held in October 1969 and was jointly sponsored by the university, the Pennsylvania Department of Education, and the Association of Junior College Presidents. It had as its general theme "Occupational Education in the Two-Year College." A second and similar conference was held in October 1970. The center plans to conduct an annual summer conference on topics of significance to the total complex of Pennsylvania institutions of higher education as well as institutions of higher learning nationally.

An introductory word may be said about methodology as used by staff of the center as they pursue their studies. The center employs the words "study of higher education" and "research and scholarship" broadly. It thus makes bibliographical, synthesizing and analytical studies as well as studies that conform to more traditional methodological research criteria.

## Areas of Concentration

The immediate emphasis of the center has been on studies of higher education organization and administration, frequently termed "governance," and on studies related to manpower needs. As part of the latter focus, the center is exploring occupational education in two-year colleges as well as the status of graduate and graduate-professional education. Because of its special responsibilities in a Land Grant university, the center will also maintain a continuing special interest in the mission of this class of universities.

### Governance Studies

A major governance study of the past year has been a study of the University Senate of Penn State. Three foci were used: an assessment of the forces that resulted in changing the organization of the senate in 1967 and an evaluation of the accomplishments since that time; an examination of the senate as organized faculty involvement in university policy making; and senate consultation and relations with the administration in both normal and "crisis" situations.

A significant change in senate organization was made in 1967. What were the reasons for this change, what were the goals of the reorganization and to what extent have these goals been realized? One of the reported goals of the reorganization was to increase faculty and decrease administrative involvement, and if this does prove to be the case, the extent to which it has occurred will be examined.

The study is also concerned with assessing the functions the senate performs as an organized attempt to assure faculty involvement in significant questions of university policy. With what issues is the senate centrally concerned and what does it consider tangentially or not at all? In cases where it is not involved, is this by senate choice, administrative oversight, a tacit agreement that this is "out of our sphere of competence" or to some other reason? Internal senate politics will also be examined to determine decision-making patterns, the "representativeness" of these patterns and the extent to which senators are held accountable for their decisions.

Additionally, the relations of the senate with central administrators is of prime concern. On what issues does the senate advise the administration and what is the nature and substance of that advice? When advice is requested is sufficient time given to formulate an adequate response? In times of crisis, who speaks for the senate and how is such advice reported back to it?

In order to answer these and other more detailed questions, a variety of data are being analyzed including in-depth interviews with senate leaders, members and other concerned parties; committee reports and other senate documents; and committee membership records. The study is scheduled for completion in the near future.

A study of faculty participation in governance of four-year state colleges and of public junior (community) colleges is being designed. This study will be carried out during the next academic year.

Another study in the general area of governance is concerned with the origin, structure and functioning of institutes and centers in complex universities. Work began in September 1969 and will continue through 1971. The study focuses on one of the most significant changes in the organizational structure of complex universities in recent decades, the emergence

of large numbers of semi-autonomous research institutes and centers. A variety of organizational terms may apply, in addition to institutes and centers, including laboratory, office, bureau, service, and others. Perhaps as many as 5,000 such units are in operation in American universities and in some universities, institutes may be as numerous as departments.

That some change should have come about in the organizational structure of the university is, of course, no surprise. When the range of goals and functions of the contemporary university are contrasted with that of a half century earlier, the surprise is that the change has been as modest and gradual as has been the case.

No simple rationale will explain the rapid growth of institutes and centers, for not all of the impetus has come from an inability of the conventional departmental structure to adapt to new functional demands. It is more likely that the impetus came from a wide range of forces such as new sources of financial support, new constituencies, different faculty aspirations and role expectations, needs of administrators to exert academic leadership, urging from external sponsors, individual and institutional needs for status and prestige, the sheer burden of bigness, a need to improve lines of communication and relationships, and a variety of other forces.

The recent growth, however, has not been without controversy -- complaints are numerous. Some critics describe the growth of institutes and centers as creating an administrative jungle while others, particularly faculty members of traditional departments, argue that the addition of institutes and centers has placed an unnecessary drain on already overtaxed university resources. Department chairmen complain about weakened faculty loyalties and distorted value systems of those associated with institutes and centers. Some members of specific disciplines resent the visibility and attention received by the task- or problem-oriented units and charge that institutes and centers tend to persist long beyond the

intent of the initial mission. But in spite of the obvious lack of affection for institutes and centers in many quarters, the numbers increase each year.

In view of the large number of institutes and centers already in existence, and in anticipation of a probably continuing increase in this number, it is important that colleges and universities gain a more sophisticated understanding of these new organizational forms. The irresponsible, opportunistic and uncoordinated growth of the 1960s must certainly give way to a more carefully reasoned, rationally planned and functionally based development during the 1970s.

Perhaps more significant, however, is the need to glean from the study of institutes and centers insights that would suggest new modes of organization and operation for the complex university. Since the emergence of the academic department as the primary organizational unit of the university, the organizing principle has revolved around the discipline and profession rather than the task or function. The emergence of institutes and centers, initially as vehicles for the conduct of research, introduced the first significant organizational alternative to the discipline-based department. Is it an answer to the "organizational lag," or merely another example of the confusion and disorganization that plagues the contemporary university?

## Manpower Needs

The principle study underway related to manpower is designed to determine the extent of programs for human services occupations in the two-year colleges of the nation. This study has a three-fold objective: to describe the present status of human service education; to anticipate the direction human service education will take in relation to emerging human needs; and to propose curricular models to meet these evolving priorities.

Two terms used in this study need definition. "Human service occupations" are those occupations that

help to fulfill physical, psychological, and/or societal human needs. Very often these services are performed by paraprofessionals. A "paraprofessional" is one who can perform a significant role in a specialized area even though his education and training do not qualify him for full membership in a profession.

A survey of 194 two-year colleges and collegiate centers was undertaken in a pilot study, the focus of which was to gain information related to the programs and curriculums in human service being offered and the occupations for which these programs were to serve as preparation. One thousand and six programs were identified in the 194 colleges studied. However, 62 percent of the colleges offered five or less human service education programs, while 2 percent offered 20 or more. These results suggest that few of the colleges surveyed devoted extensive attention to human service programs.

Among the 1006 programs, 381 different program titles were identified. These program titles served as guides for understanding the present range of programs within human service education. Twelve general human service fields were identified through the use of these specific program titles.

The main study will follow during the coming academic year. Initially, a description of the current status of human service education will be prepared through the use of data collected in a nationwide survey of all two-year colleges and two-year collegiate centers. After identification of existing and proposed human service programs from catalogs and brochures, has been completed, three aspects of each human service program will be reviewed -- the initiating force, the nature of the curriculum, and the utilization of the manpower educated through these programs.

Studies of Limited Scope

The studies mentioned above are extensive in scope and comprehensiveness. The center has also con-

ducted several studies of limited scope focused on the problem of disadvantaged students and the application of systems analysis to higher education.

An initial concern to understand the timely issues confronting the university in the unprecedented demand of Black students for higher education seemed appropriate to the center's mission. The first effort along these lines was a report on the preparation of the various colleges within The Pennsylvania State University for the arrival of a group of "special admission students." Entitled "The 'Special Admission Student' and the Colleges" it sketches the anticipatory plans and preparations for this primarily Black group of students as seen from the deans' perspectives. Review of the growing body of literature on Blacks in higher education seemed useful to complement the initial effort and place it in a national perspective. "Higher Education and the Atypical Black Student," another center report, poses the question as to how a higher education institution is to respond to the issues of admissions, compensatory education, and to the provision of courses in "Black Studies" in the context of contemporary American society.

The entire question of admissions in higher education is equally acute. The center is preparing a document tracing the history of admission requirements to American institutions of higher education from 1636 to present. It is hoped that by an analysis of how the present "selection by regression equation" practice came about, that an opportunity will be provided to rethink directions for the future.

"COLLOQUY: Student-Initiated Reform in Higher Education," was a special paper of the center that described the efforts of a group of Penn State students trying to influence educational substance and practice at the university. A second study underway is comparing the small number of students who are active in such organizations as Students for a Democratic Society (SDS), Young Americans for Freedom (YAF), Black groups, those

involved within the "experimental college" format at Penn State and random students on campus with characteristics found by others to merit categorization as the "activist" student.

Another project requiring half the time of one staff member over a period of 12 months is designed to report the "state of the art" regarding systems analysis as a tool for higher education study and management. This survey of systems, which has been substantially completed, makes a differentiation among four different aspects of the application of systems analysis to higher education. These are:

(1) The recognition of systems analysis as a useful way of resolving problems of choice among various alternatives through the application of quantitative or semi-quantitative methods to the judgment process;

(2) The application of specific techniques and tasks devised for systems analysis in engineering and management to problems in higher education;

(3) The application of a limited subset of the above to research or study of higher education; and

(4) Directed research aimed at overcoming the inability to quantify certain aspects of the problems of choice in higher education, including such problems as measurement of output, measurement of the political environment and lack of an adequate data base.

A review of the literature suggests that a substantial amount of work has been done or is in progress with regard to the second and fourth categories. Significant effort is being expended to provide higher education with models of the important elements of the administration of colleges and universities. On the other hand, there is very little in the literature to indicate that applicable techniques and tools are being used adequately for studying important aspects of higher education.

A diversity of opinion exists with regard to the efficiency of systems analysis applied to higher education. Considerable confusion about what is denoted or connoted by the term, "systems analysis" has also appeared in the literature. To some, systems analysis represents a panacea for all of the ills of higher education. Others sense that there has been an "evangelical oversell" of various precesses (Program Planning and Budgeting Systems, Computer-Assisted Instruction, Management Information Systems, etc.), which are being called systems analysis.

The aim of this survey has been to examine the "state of the art," and the results indicate that ambiguity about the definition of systems analysis and about its efficacy for higher education characterize the perspectives at this time.

Studies Supported by the Center

There are four projects supported in some part by the center that are being directed by university faculty other than those on the center's staff or by advanced doctoral candidates. Two of these projects have been completed -- one, a study of faculty attitudes toward collective negotiations and the second, philosophical - educational orientations of faculty in Pennsylvania's community colleges. A third project that is presently under way is designed to investigate the organizational dynamics in selected four-year colleges in Pennsylvania. This study includes an analysis of interactions within and among three constituencies (administration, faculty, and students) with respect to 10 criteria of organizational health as outlined by Matthew Miles. In a fourth project, two faculty members of the Division of Education Policy Studies are studying the responses of small colleges to student pressures for institutional change. The colleges being studied include private and public, church-related and secular colleges in the Commonwealth of Pennsylvania. The investigators plan to report on variations among these colleges in their responses to student pressures for curricular and structural changes, and to identify institutional and social determinants of these varia-

tions. Another project undertaken jointly by the center and faculty in the Division of Education Policy Studies is an exploratory study of student and faculty interactions within specified administrative units.

In cooperation with the Academic Development Committee of the University Senate, and the Offices of Student Affairs Research and Planning Studies, the center is conducting a study of the academic operating characteristics of the university as perceived by its constituencies. The purpose of the research, which is one aspect of a program of institutional self-study initiated by the Academic Development Committee, is to develop information about how certain areas of university functioning such as governance and academic freedom are presently perceived by those in the university community and what the desired future status of these areas should be. A comparison of the present and desired future status of university functioning, as seen by selected subgroups within the university, should provide useful data for decision makers, planners, student leaders, others concerned with improving communications, and for the future goals, priorities and directions of the university.

Data have been collected through a survey instrument adapted from the Educational Testing Service's *Institutional Functioning Inventory* and are presently being analyzed. Respondents include representative samples of faculty, staff, administration, graduate and undergraduate students from the University Park campus and samples of faculty and students from each of the 18 other Commonwealth campuses.

The results of the research and recommendations for change will be published in a report to the senate by the Academic Development Committee. Excerpts and summaries will be reported in the *Daily Collegian* (the student newspaper) and the *Faculty Bulletin* during the 1970 Fall term.

## Bibliographies

The center has produced four bibliographies that have been made available to faculty members, administrators, and students of higher education at this university and elsewhere.

"Selected Bibliography in Higher Education," September 19, 1969

"Student Unrest on the American University Campus: A Bibliography," November 1969, by David W. Leslie

"The Black Student in Higher Education: A Bibliography," November 1969, by W. Frank Hull IV

"Selected Bibliography on the Concept of Leadership," June 1970, by Robert R. Smedley

## Future Activities

During its first year of operation, the Center for the Study of Higher Education has attempted to fulfill its five-fold mission through involvement in the research, service and teaching missions of The Pennsylvania State University. It has initiated research on a limited range of problems related to the governance of colleges and universities, manpower needs, selected problems such as admissions, and other matters of a more limited scope. The center has developed strong cooperative relations with other agencies both within and without the university in an effort to illuminate and analyze problems of higher education. Finally, the center has attempted to take seriously, through publications, conferences and consultation, its responsibility to disseminate research results widely and to organize and encourage discussion and analysis of the crucial problems of higher education in the decade of the 1970s. It has initiated requests for external support in an effort to broaden the funding base of the

center and plans to continue to pursue these ends in the coming year.

Priorities for future studies will continue to fall in the areas of governance, examination of manpower needs, the appropriate contemporary role of the state and Land Grant university, and issues of graduate and professional education. A visiting scholar program has been initiated this fall with the arrival of an administrator from one of the Commonwealth campuses on leave at the center for the academic year.

# INSTITUTIONAL SELF-STUDY AT THE PENNSYLVANIA STATE UNIVERSITY: A SUMMARY AND AN OVERVIEW

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## SUMMARY

This monograph has presented a series of essays describing the institutional self-study efforts conducted by the major functional areas at Penn State. It is not a "research" document, but rather seeks to describe the "state of the art" as it existed in 1969-70. This last chapter summarizes the essence of the papers and raises some questions about institutional self-study at Penn State.

# INSTITUTIONAL SELF-STUDY AT THE PENNSYLVANIA STATE UNIVERSITY: A SUMMARY AND AN OVERVIEW

As the first paper in this volume points out, a common definition of institutional research is not available. Institutional research is loosely defined as whatever an institution does, by whatever methods, in order to know its inputs, its operations and its outputs. The history of institutional research in American higher education is one indicating ambiguity of purpose and process. It is fairly well accepted, however, that this endeavor has become an important aspect of higher education only within the last decade. The "professionals" are beginning to accumulate a body of knowledge about institutional research, but the assimilation of this knowledge into practice seems to lag. One senses that nationally, the institutional researcher is frustrated by this failure of his work to make an impact. Never-

theless, colleges and universities are in a position that demands accurate and adequate self-knowledge, both for internal purposes relating to institutional development and to meet the political test that confronts them with demands for stricter public accountability.

The institutional research effort at Penn State can best be summarized by referring to the wide variety of offices conducting self-studies and the many foci of the studies that have been listed throughout the papers. Although there is no central coordination of institutional research on the campus, self-study is an integral -- even a formal -- aspect of various vice-presidential operations. In some cases, the self-study function is primarily directed toward the concerns of sub-vice-presidential departments (as is the case in business operations). Many second and third level organizational elements are supported by vigorous self-study efforts.

The *Office of the Vice-President for Planning* directs its studies toward the adaptation of the university to its "ever-changing environment," "providing guidelines for the evaluation of existing programs and consideration of new ones," justifying the university's needs to external funding agencies, and "guiding the orderly and rapid development of the statewide Pennsylvania State University system." The development of five-year plans, the construction of an "instructional activity model," and the design and development of an integrated management information system represent three major efforts currently under way. Recent studies have been and continue to be made that focus on student flow through the university and its sub-parts, the development of index of the university's educational performance, the cost of new program proposals, and the impact of the community college on the admissions picture in Pennsylvania from 1970 through 1975.

Cost justification reports are the main focus on self-study efforts in the *Controller's Office*. Specific notice is made on the pressures faced by all institutions of higher education since colleges and universities are being called to account for their expenditures to a greater extent now than at any time in the recent past. Detailed analyses of departmental budgets; studies of unit costs of instruction by various levels within the university; summaries of financial data on graduate assistantships, fellowships, and sabbatical leaves; instructional room space utilization analyses; and studies of summary data on faculty are examples of institutional research conducted by the Studies Department within the Controller's Office.

Concern about the extent to which universities will be held accountable for their practices is also expressed in the paper describing self-study activity in the *Department of Personnel Services--Employee Relations*. Studies conducted in this department are designed to increase the effectiveness of recruiting, selecting, hiring, and orienting new non-academic employees, and to evaluate the university's salary scale and benefits program, among other things. Efforts are made to provide guidelines on personnel practices for administrative officers through specific studies and the dissemination of information.

The *Management Engineering Department* reports to the vice-president for business. Special studies are conducted by the department for the purpose of exploring alternatives and suggesting optimal courses of action on business-related questions. The analogous function in an industrial organization would be performed by a department of industrial engineering. Two areas of particular and continuing concern have been space utilization and job standards. The goal of the department is to assure optimal effectiveness and efficiency in operations under the business area.

The efforts outlined above point to the university's long standing concern for operational efficiency. Recognition is made of the increasing pressures for accountability faced by the university in its dealings with state and federal governments. Justification of what the university does and is planning to do, as well as how these activities are conducted, appears to consume an important portion of the time devoted to institutional self-study in four major areas -- planning, finance, business, and accounting.

The range of self-study efforts in academic and instructional activities is somewhat different. The Office of the Vice-President for Academic Affairs and of the Department of Planning Studies in the division of Continuing Education both support research efforts that have implications for instructional activity in all colleges and universities as well as for Penn State.

The *Academic Affairs Office* supports some studies through the Division of Instructional Services. The division's emphasis is on service to the faculty in course development and evaluation, in the use of instructional aids, and in test construction and scoring. In addition to the service aspects of these operations, the division conducts basic research on instruction.

A second area of research within the Office of the Vice-President for Academic Affairs is conducted in the Division of Academic Services, which has as its basic mission performing the admission, record keeping, and registration functions. Basic data on enrollment and academic records are provided in reports to a variety of internal and external agencies.

The Academic Affairs Office also conducts special studies for reports to the Board of Trustees, to the president, and to the University Senate. In this capacity, the office responds to requests for data to aid in the evaluation of pending decisions and existing programs.

The *Department of Planning Studies in the division of Continuing Education* is apparently unique in that it is believed to be the only applied research unit in an American university whose goal is the collection of data for designing programs in continuing education and evaluating their impact. The department conducts studies in order to identify the continuing education needs of selected professional groups, to assess the effect of instructional aids in continuing education courses, and to assess the effectiveness and impact of current programs. The division of Continuing Education conducts applied research over the range of its instructional concerns, and its Department of Planning Studies reflects this range in its broad evaluative efforts.

Two other specialized offices also conduct institutional research projects at Penn State. These are Student Affairs Research and the Center for the Study of Higher Education.

*Student Affairs Research* supports the activities of the vice-president for student affairs and his staff through four components: data processing, systems research and services, specific research and consultation, and long-range programmatic research. Examples of studies conducted include an in-depth operations analysis of the financial aid function, an extensive study of Penn State's educational goals and characteristics as viewed by the various segments of the university, and the development of a model for career choices and adjustment during the college years.

The *Center for the Study of Higher Education* conducts studies of a broad nature about American higher education while attempting simultaneously to serve Penn State. Studies of special purpose institutes and of academic senates involve elements of the university in comparisons with the same elements at similar institutions. Other studies in progress or recently completed include a survey of the extent of human service occupational programs in the two-year colleges of the nation, a summary of Penn State's plans and preparation at the

college level for special admission students (largely Black), a summary of the "Colloquy" program at Penn State, and a report on the "state of the art" of the application of systems analysis to the management of higher education. The center is now designing a series of studies in the area of graduate education and education for the professions, which should have direct applicability to Penn State's work in these fields. Additional research by faculty and graduate students into problems in higher education is being supported by the center.

## An Overview

There is no central office for the conduct of institutional research at Penn State. Rather, each major office assumes the responsibility for the conduct of studies in its own areas of concern. Such decentralization should be examined in light of what one can learn from the literature on organizations and in light of what is known about higher education. The points to be made in this section are directed toward stimulating thought with regard to the way in which this university approaches the matter of self-study; no direct evaluation of Penn State's efforts is intended insofar as no effort has been made to gather the information that would be necessary for such an evaluation.

## Advantages of Decentralization

Decentralization of institutional research appears to have a number of advantages. First, when centralized control of information is not exercised, it is difficult to build and sustain a monopoly over critical information concerning the institution. Sub-parts of the organization exist in relative equality with respect to possession of the information that is needed in administrative decision and policy making. No one administrative unit can gain a dominant position or exercise disproportionate influence upon decisions due to a superior control of factual data. Further, the internal operations of the various units are not "threatened" by arbitrary or unsubstantiated criticisms that can arise

from the possession of incomplete information in a central office in which perspectives may be quite different from those closer to the "firing line."

Second, decentralization allows for the nurture of an analytic attitude within operating agencies. Where each unit is obliged to assume responsibility for analysis and interpretation of its own functions, the development of a "research minded," data-based, decision-making structure is encouraged. Whether or not this in fact occurs probably depends on factors other than administrative decentralization. Administrators at all levels have to encourage and require data-based self-analysis of operating units. The extent to which these units are held accountable for a data base to support their recommendations is probably an important element in fostering analytic attitudes.

Responsibility for interpreting and analyzing one's own function and efforts appears important too, in the generation of a positive morale and a sense of autonomy. Individual pride and a sense of identity with the operating unit are enhanced in a decentralized system.

A third advantage presumably inherent in a decentralized system is that the data base for decision making is immediately available to the persons involved in the decisions. That is, units that produce data in a decentralized system will be able to use this data in their own decision processes. A clear example at Penn State would seem to be the case of the Department of Personnel Services -- Employee Relations. A number of studies regularly conducted in that department lead directly to practices and policies that take into account what has been found.

Disadvantages of Decentralization

There are also clear disadvantages in decentralization. First, departmentalization of the institutional research function tends to inhibit communications among operating agencies, each one of which may

feel it is self-sufficient in terms of producing the data required for making decisions (Rourke and Brooks, 1966, pp. 54-56). The appearance of barriers in communication may not be intentional -- it is unlikely that it is. Rather, this appears to be a natural symptom associated with decentralization.

The consequences are obvious. Reports and data produced by one agency may be useable elsewhere in the organization. There is a real danger in a decentralized system that such reports and data may never reach those to whom they would be useful. Obvious, too, is the likelihood that duplication of effort will occur. Various departments may be studying aspects of the same problem without knowing what the others are doing.

Thus, there is a particular need for coordination when efforts are conducted on a decentralized basis. Often, informal communication mechanisms are relied upon with no attempt made to evaluate their effectiveness. An informal communications system may serve those who are very well acquainted with the personalities involved, but it is more likely to result in departmental isolation and segmental data gathering.

In interviews with the writers of each of the papers in this volume, problems of coordination and communication were often cited. It was apparent that many operating units were very much interested in what kinds of data and reports other agencies were producing that might be available for wider use. This suggests that informal communication mechanisms at Penn State could be improved.

Barriers to communication are also created when the data produced by one agency are technically oriented and are not translated into a more common language when they are reported. For example, summary reports in terms of student credit hours or unit costs of instruction may be quite useful to a finance-oriented office, but the same data may have to be recast to be of use to planners.

Another aspect of the same problem is whether or not data-based technical reports produced by autonomous administrative units are designed to shed light on given problems or whether they are just designed to be repositories of information.* Here again, technical reports must be translated and the meaning of the data explained as they apply to a particular problem. It appears that many of the reports listed in some of the papers in this volume are reports *only* and not specifically related to institutional problems.

A second and perhaps the most powerful, criticism of decentralized operation is the very real danger of goal displacement. This occurs when operating units become more concerned with their own internal problems to the subsequent neglect of wider university concerns. For example, it is possible that "professional researchers" are more interested in the research excellence of their reports rather than in their relevance. Indeed, researchers are often critized for dealing with problems that their methodologies allow them to answer rather than with less definable but more relevant problems that confront the university. It is easier to produce a report describing the socio-economic status and career patterns of Penn State undergraduates than it is to deal with questions such as what impact is a system of open admissions likely to have on the Commonwealth of Pennsylvania's "system" of higher education and Penn State specifically? Yet, the latter problem may be more important in terms of the university's broad mission. In short, the university's mission of service to the Commonwealth of Pennsylvania may be displaced as a goal for the individual researcher and his operating agency in favor of more definable and neater micro-designs.

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*Data-based reports may be technically or quantitatively oriented, but they may also provide non-quantitative information such as opinions and "intelligent guesses" about decision-making alternatives.

Third, in a decentralized system there is no one agency or person with the responsibility for the total picture of university operations. It is, perhaps, too much to ask operating agencies to adopt a wider perspective in gathering and analyzing their data and producing reports. It is probably more realistic to expect that such operating agencies will develop a degree of "tunnel vision" with respect to their own operations vis-a-vis the total university.

In the absence of a central responsibility for the function of institutional research, the gaps between operating agencies are likely to remain unfilled. Agencies produce reports that they "expect" other operating agencies to use, but systematic evaluation of such use is often lacking. Similarly, no one agency is charged with the responsibility for anticipating developments in public higher education in the state and the nation, developing alternative responses for Penn State and making recommendations about these alternatives. For example, many critics of public higher education in Pennsylvania have pointed out that the development of the 19 Commonwealth campuses and the 12 or so community colleges in Pennsylvania is on a collision course. It is not apparent from our cursory knowledge about institutional research at Penn State that the problem of relations between the Commonwealth campuses and community colleges is being considered from a data-based perspective.

Lack of a centralized responsibility also hampers the development of initiative on the part of the university about such problems as statewide coordination and relations with other segments of the Pennsylvania higher education community. In short, where does the initiative lie for anticipating problems of a university and statewide nature and does the university have a data base on which alternatives might be developed?

## A Course of Action

This paper has discussed the general advantages and disadvantages of decentralized institutional research. There are no data, other than the papers in this volume, to suggest a definitive course of action to meld these pros and cons into a comprehensive institutional research policy for Penn State. Indeed, one might argue, as does Dyer, that a balanced approach between a centralized and decentralized structure would be best (1966, pp. 456-457). His model seems to avoid either pure centralization or pure decentralization. Rather, it would appear that he favors centralization in terms of identifying areas or problems to which examination will be directed, and decentralization with regard to the conduct of the studies. Presumably, the involvement of disparate segments of the university in the study of certain problems will enhance appreciation of the institution's dilemma and will bring a wide-ranging expertise to bear upon the solution. Participation of many different people in the study and in formulating solutions to hard questions also offers a greater sense of legitimacy to their implementation.

It seems an appropriate time for Penn State to reexamine the need for a balance between its current decentralized operation and other alternatives that might be available. Such an evaluation should seek answers to the following questions:

1. To what extent have the advantages and disadvantages of decentralized operation been realized at Penn State? How well are informal communications and coordinating systems working? Is there too much duplication of effort in the reports being produced by the various agencies involved in institutional self-study? How are these reports being used? Should new reports be instigated and some old ones discontinued?

2. Are there significant questions of internal university policy that have to be decided without an "adequate" quantitative and qualitative data base? If yes, what organizational response would be appropriate?

3. Are there significant questions of university relations with external agencies that have to be decided without an "adequate" quantitative and qualitative data base? If yes, what organizational response would be appropriate?

4. Where does the responsibility and initiative lie for raising questions of potential significance to the university?

5. What person or agency has the responsibility for adopting a university-wide perspective about problems of institutional effectiveness and mission?

Answers to questions such as these would provide a data base for consideration of whether continued decentralization or a degree of centralization would result in a more comprehensive policy for institutional research.

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